



PHILIP MORRIS EUROPE R&D

THREE-YEAR PLAN

1994 - 1996

CONFIDENTIAL

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Executive Summary

The PM Europe R&D Three-Year Plan, 1994-1996, addresses a vastly changed business climate from the previous year. A major cigarette price war in the USA, combined with large investment in the newly opened Eastern European markets has placed severe burdens on the financial resources available to carry out planned activities. Critical self-examination of R&D priorities and resource allocations has become a continual exercise. Yet R&D must also adapt to meet the additional demands created by new internal and external issues driving our business.

As a result, 1993 has already seen considerable change in traditional programs such as visual quality audit, tobacco quality audit, and ingredient monitoring. Further reviews during the plan period will also impact the smoke laboratory and materials quality audit programs.

New or enhanced emphasis is being placed on several areas in order to help guide our future needs. Some examples include:

1. Creation of an Operations Support Task Force in order to better define, in co-operation with affiliate and headquarters functions, the central needs for our QA, Technical Service and Process Development support;
2. Creation of a Competitive Intelligence effort which might ultimately help us to better target our new product design strategies;
3. Enhancement of the Consumer Perception of Quality program in order to more precisely define our visual quality and visual quality audit needs.

Despite the many changes, R&D will continue to align its programs and resources to best satisfy the five Strategic Goals in support of the business. These are:

1. Support Operations' three-year objectives in the areas of quality, cost, and productivity;
2. Support the growth of the EEC and EEMA Region businesses in the short term;
3. Develop new and innovative products which address consumers' desires in the long term;
4. Identify, evaluate, and develop technologies applicable to future products and processes;
5. Address external issues and requirements.

While the Three-Year plan represents an extensive effort on the part of R&D to look forward to the technology needs of the business, rapid changes in our markets and ever more severe constraints on our resources will result in more frequent revisions of our priorities. In order for such adjustments of the R&D focus to be constructive it is essential that we receive the input, guidance and support needed from both Regions.

PM Europe R&D Three Year Plan: 1994-1996

I. MISSION STATEMENT

The mission of PM Europe R&D is threefold - first, to ensure that its efforts continuously contribute to the growth and profitability of Philip Morris Europe, second that it protects the quality and the integrity of our products, and third, that it conducts its daily operations so that they rigorously adhere to the highest scientific principles.

There are five major areas to which PM Europe R&D must contribute:

- A. Support PM Europe's factories, particularly in the areas of quality assurance and process development. R&D must ensure that our products and raw materials are of the highest quality, as well as contributing to the continuous improvement of factory operations.
- B. Support PM Europe Marketing through the development of new products. Decisions concerning products to be developed must be based not only on requests from the PM Europe Marketing Department, but must also be based on market trends and competitive analysis. The development of new product technology must also be pursued.
- C. Ensure that PM Europe operations and facilities meet local regulations and are completely consistent with all aspects of the Philip Morris Companies' environmental philosophy. This requires the participation of every department within R&D.
- D. Contribute to productivity improvements and develop procedures to increase operational efficiency.
- E. Interact closely with all Philip Morris Companies' R&D facilities to ensure that synergy is achieved both through elimination of duplication and utilization of novel discoveries where appropriate.

Lastly, it must be emphasized that PM Europe R&D has an unfailing responsibility to carry out its work while maintaining complete scientific integrity and apply a total quality philosophy to its internal operations.

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II. INTERNAL ANALYSIS

A. Organization and structure

The PM Europe Research and Development Laboratory currently has a budgeted staff of 181 individuals. The laboratory is divided into five sections; namely, Product Development, Quality Assurance, Research, Process Development, and R&D Services. Budgeted head-count for each of these sections are as follows: Product Development, 23; Quality Assurance, 75; Research, 30; Process Development, 16; and R&D Services, 30. In addition, there is an administrative staff of 7. The total R&D operating budget for 1994 is projected to be at the same level as the RF 1993.

B Current Programs

Nine major programs were outlined in the previous PM Europe three-year plan. These programs are listed as follows:

- Operations Support
- Reconstituted Tobacco
- Expanded Tobacco
- Product Development
- New Product Technology
- The Competitive Environment
- New Process Technology
- Environmental Tobacco Smoke
- External Issues

Six sub-programs were covered under the Operations Support Program. These issues were: 1) enhancing and ensuring the consistency of the quality of our finished products, 2) optimizing the quality of the raw materials, 3) contributing to productivity improvements, 4) standardizing quality assurance functions at all locations, 5) ensuring an adequate Quality Management System, and 6) ensuring the consistent and optimal quality of blend component processing.

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C. R&D Achievements

1. Operations Support

a. Product Quality

Objectives:

Ensure that our products strictly adhere to the highest standards of quality with respect to consumer expectation, and that product quality serves as a competitive advantage.

Customer complaint definitions were established and discussed with the main affiliates. The system designed to handle customer complaints is ready for implementation. However, additional resources have to be provided for inter-company data transfer and data treatment. The customer perception of quality program will only be initiated once the customer complaint standardization program is terminated. Discussions with PM USA have been initiated.

The VQA activities were reviewed. Sampling schemes were revised in order to increase the number of yearly samples. VQA standards were upgraded, and new quality limits were introduced.

The new VQA system was introduced in Holland, Spain, Turkey and Belgium. Germany will switch to the new system beginning in 1994. Training has been given to the four factories of MTI and to the factory in Senegal.

Active "on-site" assistance has been given to ten factories. Emphasis was placed on trouble shooting and training of operators and inspectors on visual quality. Introduction to quality was given to all production personnel visiting FTR or TRACE.

The preparation of a handbook for operators containing simplified VQA standards and procedures for corrective actions is continuing and its completion is foreseen for 1994. It will be used to promote operator control on the factory floor.

The VQA PC application from Philips has been adapted to the needs of the new affiliates and is being introduced where needed.

Quality assessment of all the makers/packers installed in Turkey was carried out at the vendor. PM-ES and EEMA-Engineering personnel were trained on the assessment procedure established by PM-USA-QA.

Product, material and ingredient specifications for Spain, Hungary, Turkey and the Czech Republic were established and access to the mainframe application was given, where appropriate.

Efficient monitoring of PM products of both Regions continued through the plan period.

Support was provided to the FTR technical department for the development of a new mentholating machine. The new equipment will be available early 1994.

b. Raw Material Quality

Objective:

Continue to monitor both tobacco and non-tobacco materials using new technology where applicable, and whenever possible establish non-tobacco materials' specifications based on finished product performance.

Inspection procedures for ingredients, filter additives, and adhesives (PME Method No. 780) were finalized and issued in August, 1993. All enclosures mentioned in the plan are available.

General shipping case specifications for FTR and Philsa were issued. A draft of general specifications for adhesives has been established and discussed with all major PME adhesive suppliers.

A new mainframe application for the supplier overall rating has been developed and implemented in all major affiliates. Audits of all suppliers identified in the 91/92 rating were conducted. Special audits were conducted at LMG-UK and Van Genechten.

Near infra-red (NIR) calibrations have been completed for the majority of the commonly used formulations for after cut flavor, bright casing, and burley top casing including Amethyst reformulations. A collaborative study between R&D and PMG Munich and Berlin is in progress which will allow tolerances for the method to be established. It is planned to have this process implemented in Munich and Berlin by the end of the year. In addition, PMH has also purchased a NIR spectrometer, and training of personnel at BOZ has been initiated.

A near infra-red method was designed, tested, and written to rapidly analyze water, glucose, fructose, and sucrose in invert sugar. This method has been transferred to PMG Munich and Berlin.

A comparison was made between cigarettes packaged with standard aluminium foil and a metallized inner liner. No major differences were seen between the moisture migration rates for the two different packs.

A method was developed for the amino acid betaine in invert sugar which led to the identification of this substance, normally found in beet sugar, as a potential contributor to subjective problems. This information was used to reformulate the specifications for invert sugar.

c. Productivity Improvement

Objective:

Contribute to factory productivity improvements and waste reduction by ensuring that materials are specified to optimize machinability while minimizing down time and rejects.

Qualification of new plug wrap/tipping combinations continued. Trials with FUPOV 12'000 failed due to machinability problems. New papers are being evaluated. The test series with FUPOV 3000 was abandoned as the supplier was not able to produce a paper with same characteristics as his competitors. The tipping paper Blancophan 400 ex Benkert has successfully been tested at different locations. An industrial trial is being initiated for final qualification.

The qualification of de Mauduit 137-1 calendered cigarette paper was finalized and showed the expected improvements at high speed. Modifications for S&H Pela 25MN and 87Mn were completed. Additional priority was given to the qualification of a OFM countertype of Pela 54Mn for Dresden as well as to Maglio and Tervakosky countertypes of Wattens W70 for the Italian Monopoly and ATO.

Oxygen bleached wood pulp papers have been examined for use on the PE Marlboro. Prototypes from de Mauduit, Wattens and S&H were acceptable from an analytical point of view and are currently being evaluated for taste characteristics.

R&D support for machine improvements in secondary has been discontinued.

Concentrated base flavors were introduced throughout the two Regions.

d. Quality Assurance Standardization

Objective:

Provide and distribute quality assurance know-how throughout the EEC and EEMA Regions.

Tobacco weight was introduced into the specifications of most of the brands produced by affiliates and licensees. Some small brands still do not contain this information.

A simple automatic weighing and reporting system was implemented in FTR (Onnens), Kutna-Hora and Hungary for use on PC's. A new oven for the determination of OV has been evaluated in order to replace the current model which is no longer manufactured.

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Extensive support has been provided to new affiliates in the areas of:

- Recommendations for, and implementation of, QA systems
- Training and assistance for incoming material inspections

A system for primary and secondary QA data reporting was developed. The primary data system is running; the secondary data system will be implemented by the end of the year.

The PME Method system has been brought in line with ISO 9000.

All PME tobacco suppliers have been trained for proper fumigation practices according to PM standard.

A seminar on SPC was given to Philsa personnel with the assistance of an outside consultant. A general presentation on Quality Assurance was prepared.

Two Regular Production Evaluation Panels (*8 Sensory Attributes*) were implemented in:

- Sta-Cruz de Tenerife (*25 panelists*).
- Torbali-Izmir (*20 panelists*).

The training phase was completed in Spain and the Panel is now monitoring the MLF55 production.

e. Quality management

Objective:

Provide optimal quality at an appropriate cost through an efficient quality management program.

A QA management audit check-list was developed:

A quality system documentation was prepared which can be used by all the affiliates.

The ISO 9000 support program was cancelled, as many of the affiliates have chosen different TQM approaches.

Before starting Panel implementation program in the PM factories, Dutch and Spanish Panel Leaders were intensively trained at R&D. After this, the panelists training program for the Quantitative Descriptive Panel (*15 Sensory Attributes*) started in:

- Bergen op Zoom (*60 panelists*).
- Munich (*40 panelists*).
- Berlin (*40 panelists*).
- Dresden (*40 panelists*).

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These Panels will be asked to evaluate samples for Product Maintenance and competitor monitoring.

To keep the Panel concept integrity and to ensure everybody is using the same instrument, a complete package which consists in documentation, software and hardware was developed and given to the final users, i.e. the affiliates.

The package components are:

German and Dutch translation of "Panelist Guidelines" booklet.

PME Method n° 707 : "Maintenance Panel Using Sensory Profile Method".

PME Method n° 708 : "Monitor for Sensory Profile Panels Production".

PME Method n° 714 : "Regular Production Evaluation Panels Using Sensory Profile Method".

SPA mainframe application, consisting of:

FOCUS database, for individual profiles storage (*one for the Maintenance Panel and a second for the Regular Production Panel*).

FOCUS requests for database maintenance, Panel monitoring, data analysis and for data transfer from HOST to PC.

FOCUS database for Sensory Specifications.

"SPA Application, User's Guidelines".

An automatic data entry system which consists of:

A scanner (*HP Scanjet*).

Sensorex software from Softex, which creates questionnaires and is able to read them via the scanner.

A procedure to read Sensorex files and put data into the SPA database.

Reporting forms with specific statistical analysis for:

Daily feed back to panelists.

t test for paired comparison.

Comparison to Sensory Specification.

With the package the local Panel Leaders received full support for soft and hardware installation for the starting phase, and they were trained on software applications usage.

Maintenance of PM Products:

In order to select the proper sequence of Subjective Evaluation, some guidelines have been published.

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f. Process Development

Objective:

Modify, develop, and evaluate existing and new processes in order to meet Operations requirements of both PME regions in the areas of productivity, yield, quality, and/or other needs

Extensive support was provided to EEMA Engineering Project Management concerning primaries in new Eastern European affiliates. New Blending silos were installed in Straznice, and the burley dryer optimization and capacity increase were successfully implemented.

Assistance continued to improve operation of the FTR ET cut rag preparation line in Onnens with emphasis on the DCC with casing application. Following the fire, extensive on-site assistance was provided for the recovery project.

The project for the incorporation of Comas expanded stems ex MTI Rovereto into Diana cigarettes in Italy was completed.

The concept for the European implementation of Good Manufacturing Practices and Process Specifications was established and presented to affiliates. Content and future administration were defined, and a new concept for a Process Specs. Monitoring system was established within R&D.

Up-dates for the Munich and FTR sections of the PM Europe Primary Information Manual were completed and the whole manual was converted into "Word" format including the incorporation of equipment photographs via scanner. A new software for the integration of flow charts was defined and implemented, and the ET section for FTR Onnens was completed.

Assistance to affiliates continued, particularly on-site support for the Vezifa primary, the optimization of the Berlin stem line, the definition of tobacco shelf life in Philsa, and the assessment of the MA blends ex BOZ and FTR.

Quality parameters in the primaries were analyzed, and together with Manufacturing Services the data interpretation was improved, and a new report format was implemented.

PME co-ordination of the Tobacco Utilization Program, initiated by PM USA, was established, and input on PME programs was provided.

2. Reconstituted Tobacco

Objective:

Develop and implement Process Development programs in the area of reconstituted tobacco materials to achieve optimal sheet quality and feedstock utilization to meet the business requirements of both PME Regions.

The evaluation of sheet products from Deli HTL, Eindhoven, was completed.

NBL and CL developments in PM USA were closely followed and new sheet products were evaluated. First industrial CL tests were run in Catana, Venezuela, using Venezuelan and Brazilian feedstocks. Evaluation of these products is anticipated to be completed before the end of 1993.

Un-washed burley stems were implemented in RCB/BL, liquid flavors were introduced to both RL and BL, and the humectant levels were reduced and standardized in all PM USA produced sheet materials. These materials were introduced in Europe during the year 1993.

Regional OTM generation was followed-up, and co-ordination with PME Leaf, PM USA and IOS continued.

3. Expanded Tobacco

Objective:

Develop and implement Process Development programs in the area of ET so as to meet optimal product quality, best possible level of interchangeability, and adequate safety standards.

Technical assistance was provided to Munich, Berlin, BOZ, and TSA Cadiz, and specific operating and/or product quality problems were solved. Following the major incident in Onnens on April 19, 1993, extensive assistance was provided to FTR in the areas of investigation into the causes of the fire, the improvement of the hot end fire prevention system, process layout improvement and (re)qualification of the ETNA installation. The Balex ET product from line II at TSA Cadiz was qualified.

In a continuous effort to improve product quality and multilateral exchange of technical know-how among affiliates, consolidated quarterly highlights of PM international ET activities and reports on ET quality parameters were issued. The annual PM International ET Technical meeting in Munich was organized and chaired.

ET process and product specifications were defined in co-ordination with Manufacturing Services and PME Leaf. For ET Diana at MTI Bologna the specs. and sampling and testing requirements were implemented in collaboration with AOD Italy.

In preparation for the start-up of the new ET plant in BOZ, DIET II product was successfully simulated confirming improved physical parameters and tobacco weight reduction in cigarettes. The DIET/NET implementation strategy was established and presented to BOZ. The concept for DIET II product qualification was defined with Product Development and PME Leaf. Plans were established to assist BOZ during commissioning and start-up.

NET developments in PM USA were closely followed and test runs were conducted in the Richmond pilot plant to evaluate the potential for subjective parity between DIET and NET products and to evaluate the low pressure gas impregnation technology.

The European DIET Safety Committee was implemented and the first meeting was organized in Munich. The Kellogg hazard review was co-ordinated with PM USA, and assistance was continued to the affiliates for the implementation of the recommendations. Alternate refrigerants for the chiller systems were investigated.

A study was made to evaluate the influence of DIET II on cigarette characteristics (physical and smoke yields).

4. Product Development

Objective:

Modify existing products and develop new products to meet marketing, productivity, standardization and/or regulatory requirements.

Filter length increase (or decrease for FTR) programs have been completed. Thirty-four projects were managed in parallel leading to the modification of more than one hundred cigarette product specifications covering six manufacturing centres. The number of finished filter specifications has been reduced from 32 to 22. Fifty cigarette makers have been modified in a period of six months time.

Several KS prototypes covering a tar range between 3 and 5 mg were developed by using low cost blends and different after cuts. One of these versions has been already introduced on the Chesterfield Ultra Lights for France.

For standardization within the EEC region and for cost purposes, the blend of the L&M KS-DB has been changed following a positive consumer test.

Cut width of our Ultra slim cigarette blend has been increased from 0.65 to 0.85 mm.

The "Bold" filter ex FIL-UK has been qualified through consumer testing in Germany on the PMU.

A Marlboro Lights roll was developed for the German market and launched. A blend and after cut modification was made on the ML FF roll in order to decrease the tar/puff ratio. Blend sourcing change from Munich to Dresden was made on F6 Lights and 100's. Blend standardization was also made on the Karo filter and this cigarette is now using the original Karo plain blend.

Due to the very specific French market situation (price), several cigarettes were developed although not launched (L&M Extra Lights, Fortuna Export FF and Lights).

L&M FF and Lights were developed and launched in Spain. Low cost FF and Lights products have also been developed for the same market but not yet launched. For Portugal, the L&M FF has been developed and launched; the Lights version is ready.

The development of a 100's at 1 mg tar product as a line extension for Italy has been completed.

The development of a new basic blend strips made locally has been completed for the Czech Republic. The following brands were developed or re-engineered for this market: L&M FF and Lights, Sparta FF and Lights, Petra FF and Lights, Start Plain, Start Filter-70 mm, Start KS and Bond 70 mm. Three additional cigarettes, Sparta & Petra FF Menthol, as well as the Start KS Lights, are ready to be introduced soon.

Multifilter Extra Lights KS as well as Helikon 2000 FF and Lights 100's were developed for Hungary and launched. A new brand, Toldi FF LS has been developed and successfully consumer tested. The Lights version is also ready to be launched. The development of two Helikon Menthol (FF & Lights) is completed, as well as the filter length increase on Marlboro Lights. Multifilter 100's has been re-engineered in order to improve the product performance and to standardize the filter.

PM Super Lights KS was developed for Finland and launched. A Marlboro Ultra prototype was blind product tested. Blend replacement (from FTR cut-filler to local production with BBS ex-USA) on the L&M FF was consumer tested.

Brunette Double Filter and Extra using cut-filler processed through the steam dryer instead of the gas dryer and having an increased cut-width have been consumer tested in Switzerland. Two low cost American FF products were developed and consumer tested, and two low cost Maryland type products at 7 and 4 mg tar have been developed.

For standardization purpose, the "Bold" blend was introduced on the PM Ultra Lights 100's at FTR.

For Export ex-FTR, a Bond American FF LS was developed in case additional sourcing is requested in parallel with the Brazilian production.

A Bond Street Menthol for West Africa and a Diana Specially Mild were developed and launched as line extensions. L&M Lights KS and FF 100's were also added to the product portfolio in addition to the KS FF version. Several products KS FF and Lights were developed for negotiations in Egypt and Lebanon.

A Merit KS, locally made, was developed and launched in Egypt.

Marlboro Lights 100's was developed for local production in Turkey.

A new Marlboro Lights KS for Sweden, tax class 1 (total weight below 850 mg) has been developed and blind product tested.

As a result of the qualitative vocabulary study conducted in 1989 (in FR) and 1991 to 1992 (in NL, DB, ES, CH BE), a new questionnaire to be used by the European Consumer Panel was created. It is structured as follows : (i) a hedonic part: 1 question concerning the Liking score of the cigarette, measured on a 0 to 7- point scale, (ii) a quantitative part: measure of intensity of 10 specific taste and physical attributes using a 0 to 7- point scale, and (iii) a comparison part: 1 question concerning the comparison of the tested cigarette with the current brand of the smoker.

A pilot study of the European Consumer Panels (ECP) concept was conducted in support of the EEC Filter length increase program. Three brands were tested (Marlboro Lights in France and Germany and PM Super Lights in France). Following positive results, the ECP were implemented in France, Germany and Switzerland in March, 1993. A monadic methodology was chosen and a large number of consumers were recruited (20'000 PM and competitive smokers). The ECP are dedicated to provide PME with a standardized methodology of consumer testing for the product performance monitoring of PM and competitive brands and the measure of acceptance in case of product maintenance programs or new product development.

The major brands tested by different target smoker groups by the ECP were: (i) Marlboro, Chesterfield, L&M, Marlboro Lights, PM Super Lights, PM Ultra, Gauloises Blondes family (FF, LI, UL), and Winston for France, (ii) Marlboro, Marlboro Lights, PM Light American, PM Ultra, West, West Lights, and R1 for Germany, and (iii) Marlboro, Brunette Double, Marlboro Lights, PM Super Lights, Brunette Extra, Camel, Camel Mild, and Barclay Ultra for Switzerland.

The following major Blind Product Testing EEC/EEMA programs were supported:

Marlboro Red in France, Netherlands, Belgium, Greece, Sweden, and Finland; Chesterfield in France; L&M in Finland; Toldi in Hungary; Marlboro Lights in France, Germany, and Finland; and PM Super Lights in France.

5. New Product Technology

Objective:

Increase the effectiveness in technology management in order to improve product innovation and create new and innovative ideas/concepts for the cigarette market.

The puff-by-puff RTD's and ventilations of on-line laser perforated ultra-low tar prototypes were compared to cigarettes having pre-perforated tipping. Results

showed a trend toward flatter puff-by-puff ventilation profiles in favor of on-line laser perforation.

Technology has been developed to blacken white CA-tow. As a first step this technique was applied in ultra-slim combi filters.

An ultra-slim combi filter with CA/paper was developed. This filter allows the realization of a 1mg tar product at reasonable RTD with ventilation below 80% which is not possible with a CA filter.

Diverse tobacco filters were made and evaluated; namely, stems (IS and shredded); tobacco cut filter; and reconstituted tobacco.

A new computer cigarette model has been developed. The advantages of this model are improved accuracy and extended possibilities of simulating cigarette filtration materials other than CA, as well as complex filter designs.

A qualitative study with smokers of low tar cigarettes was conducted in France from June to July with the objectives of (i) establishing a direct contact with consumers, (ii) developing our understanding of consumers, and (iii) gaining information about the following questions: Is the behavior of Lights smokers, Super Lights smokers and Ultra Lights smokers the same or different? If different, in what way are they different?

The first step of a qualitative study on low side-stream products was to collect opinions, representations, knowledge,... related to low side-stream products among consumers, in order to build a lexicon of terms related to the side-stream.

A large exchange of information took place between PM USA R&D Product Evaluation Division and the PME R&D Product Evaluation Group. A one week workshop has been organized between PM USA and PME in order to review methodologies used by both Product Evaluation entities to assess consumer acceptance of new product concepts.

6. The Competitive Environment

Objective:

Monitor competitive activities in order to ensure that PM products, technology, and quality are superior to those of the competition.

A formal effort to collect, analyze, and utilize competitive information has been initiated. The goal of this effort is to incorporate all phases of competitive intelligence, including the CIR report, competitive market tracking, and evaluation of competitive technology into a centrally administered function. Considerable progress has been made in increasing our knowledge of competitor technological strengths, and new competitor products are now evaluated with a rapid response.

A reporting system was created in order to have a record of annual and monthly sales evolution and new products launches for all EEC markets.

A selection of new competitive launches within EEC and EEMA Regions has been evaluated by the R&D Quantitative Descriptive Panel in order to evaluate their potential.

7. New Process Technology

Objective:

Develop, evaluate, and implement new processing technologies which will result in further improved product quality, better processing yield, or increased productivity.

The evaluation of the effect of the HT tunnel prior to the cut rag dryer in the Miniprimary on physical parameters was completed. Filling power enhancement and tobacco weight savings in cigarettes were confirmed, even on individual reconstituted sheet components.

The evaluation/comparison of the Hauni stem expansion process vs Comas and Dickinson STS processes was completed. Trials were successfully conducted on FC-CRS ex BOZ using the Comas installation at MTI in Rovereto, Italy, and the Dickinson STS plant at the Monte Paz factory in Montevideo, Uruguay.

Process equipment development was followed-up with various suppliers, in particular a new vertical slicer at Schiff & Stern, Vienna, and alternative equipment for cut rag and cut filler conveying at Gericke, Zurich.

8. Environmental Tobacco Smoke

Objective:

Assess the impact of environmental tobacco smoke (ETS) on indoor air quality, and investigate potential methods of altering the chemistry of ETS.

A detailed study of the adsorption and desorption of nicotine on various types of surfaces has demonstrated that two processes with vastly different rates are operating simultaneously. The majority of gas phase nicotine is strongly adsorbed onto all materials tested followed by a very slow desorption process. Other ETS components do not undergo a similar strong adsorption. These results conclusively demonstrate that the use of nicotine as a marker for ETS will give an unrealistically high estimate for ETS exposure.

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At the request of S&T the response of an air quality sensor was investigated. The sensor, marketed by Staefa Control Systems, would potentially be used to pilot a demand-controlled ventilation system. The response to different volatile organic compounds and to cigarette smoke was investigated. PME R&D is collaborating with Staefa to test the sensor under real conditions.

9. External Issues

Objective:

Ensure that blend components, non-tobacco materials, finished products, and packaging comply with existing and future legal requirements in both the EEC and EEMA Regions and that affiliates and licensees modify processes whenever necessary to comply with internal directives and external requirements.

Full support was provided to PM-EEC Packaging Services for the introduction of paper inner liners in Germany. In addition, MQA is involved in the TOP program (introduction of new pallet packaging for Tows and OPP films) and other programs of Packaging Services (e.g. water based inks).

The introduction of KABAT was discussed with the Italian and Spanish monopolies. DIANEX is being introduced in Holland. The PME infestation group assisted PM-USA in the areas of insect resistance and Oriental tobacco treatment.

The development program for natural adhesives is ongoing. Two products from Laesser and National Starch have been accepted taste and machinability wise. The main problem today is shelf- life.

Co-ordination with government laboratories is continuing. Major efforts were put on interlaboratory tests with CISC/official laboratory in Switzerland, VTT (Finland), LNE (France), and the official Laboratory in Spain. Technical assistance was provided to Kuwait, SASO, and Qatar and to the official laboratory in Italy. The accreditation of the R&D smoking laboratory is on target, and accreditation can be expected end 1993.

An extensive Aging Study has been supported by the R&D Quantitative Descriptive Panel in order to evaluate some German products (Juwel, L&M FF, L&M Mild) packed with different metallized inner liners as opposed to the standard aluminium foil.

A gas chromatographic method was implemented for the analysis of the pesticide aldicarb on tobacco. Linearization of the response of the flame photometric detector was achieved. The injection of spiked tobacco samples gave interference-free signals.

A rapid screening method for the pesticide aldicarb was developed using antibody-based technology. This method was found to work well as long as the type of tobacco used to generate the calibration curve was not changed (matrix effect). Work is ongoing to develop improved methods of sample clean-up to eliminate the matrix effect.

A study was conducted in four laboratories in order to determine if a new HPLC procedure for MH-30 could replace the current ISO colorimetric method. Although reproducibility among the four laboratories was good, agreement between the two methods was not acceptable. Work is ongoing to revise the current sample preparation method in order to bring the two methods into agreement.

Pesticide analyses were carried out on 20 lots of tobacco to be shipped to Brazil to ensure compliance with new legislation. These lots are the first samples originating from the EEMA Region which require pesticide analyses.

A thorough study to determine the source of the pesticide heptachlor found in TLA samples was carried out. The study established that the heptachlor was adventitiously introduced during the processing of the tobacco at Onnens, and was traced to a wooden conditioning cabinet. There is no heptachlor present on the tobacco used to manufacture cigarettes.

A method for the simultaneous determination of three minor tobacco alkaloids; i.e., normicotine, anatabine, and anabasine was developed.

Pre-acquisition ECO-audits were organized for Alma-Ata (Kazakhstan), ZPT (Poland), Klaipeda (Lithuania), and Kharkov (Ukraine).

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III. R&D ISSUES

Strategic Goal Number 1

Support Operations' three year objectives in the areas of quality, cost, and productivity.

1. How do we optimize the visual quality of our products to meet consumer expectations while at the same time minimizing those efforts which do not actually address consumer desires ?
 - a. What aspects of quality are important to the consumer ?
 - b. How do we manage the VQA program with the affiliates while maintaining the present R&D resources ?
 - c. What is the status of our competitors' quality and what is their quality strategy ?
 - d. Is there a need for us to differentiate quality objectives for different product positioning ?
2. How do we ensure that raw materials meet PM quality standards while addressing the inevitable increase in sample load, and how can we set optimum specifications for non-tobacco materials to minimize variations in the performance of finished products ?
 - a. What specifications can be revised to reduce cigarette performance variability of physical, chemical and subjective parameters ?
 - b. What measures can be taken to increase vendor partnering in order to reduce QA resources required for incoming materials inspection ?
 - c. What new technologies can be developed to reduce resources required for incoming materials inspection ?
 - d. How do we take advantage of purchasing synergies while maintaining quality ?
3. How should R&D support Operations with respect to improvements in factory productivity and reductions in costs through enhancement of non-tobacco material quality and the use of alternative materials ?
 - a. In what areas can improvements to non-tobacco materials have an impact on factory productivity ?
 - b. Where can cost savings be achieved through the use of less expensive materials while maintaining quality ?

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4. How do we manage our overall quality program to ensure that the required objectives are met, while at the same time ensuring that the cost of quality is minimized ?
 - a. What is the cost of non-quality or over-quality ?
 - b. What is the best tool to manage the overall quality program ?
 - c. How do we standardize our Quality Assurance functions in all locations where PM products are produced in order to assure uniformity of product performance and product quality ?
 - d. How do we use prevention to better guarantee the finished quality of our products ?
5. How should R&D support Operations with respect to primary process technology in order to optimize quality and factory productivity ?
 - a. How can R&D allocate the resources required in order to support new affiliates' primary extensions and up-grades ?
 - b. How do we identify those processing technologies which have the potential to optimize factory productivity ?
 - c. How do we standardize process technologies in order to optimize quality and productivity ?
 - d. How do we accomplish the regional implementation of Processing Specifications and Good Manufacturing Practices ?
6. How do we provide flexibility in the sourcing of ET and Recon products to meet the needs of by-product utilization and blend requirements ?
 - a. What will be the needs for Cast Leaf during the plan period and how can the needs be fulfilled ?
 - b. What are the alternatives uses for factory generated by-products ?
 - c. What is R&D's role in contributing to the safety of ET processes ?

Strategic Goal Number 2

Support the growth of the EEC and EEMA Region businesses in the short term.

1. How do we reposition our current brands and introduce brand extensions and new brands to assure coverage of the important market segments ?
 - a. What are the key market trends in the EEC Region ?

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- b. What are the key market trends in the EEMA Region ?
 - c. What are the Marketing Department plans with respect to both the EEC and EEMA Regions ?
 - d. What are the major opportunities for growth in both the EEC and EEMA Regions ?
2. How do we obtain and utilize competitive intelligence in both the EEC and EEMA Regions in order to be able to evaluate and rapidly respond to potential competitive threats ?

Strategic Goals Number 3 and 4

Develop new and innovative products which address consumers' desires in the long term.

Identify, evaluate, and develop technologies applicable to future products and processes.

1. How do we identify and evaluate new technologies which will allow us to be a leader in innovative product concepts and will also enable us to respond to competitive challenges ?
- a. What social issues may lead to opportunities for new products ?
 - b. What new product and process technologies are being developed by competitors ?
 - c. What role should PME R&D be playing in the development of alternative smoking devices ?
 - d. What new technology directed toward the development of ultra low delivery cigarettes should R&D be pursuing ?
 - e. How do we identify and evaluate new process technologies which will allow us to provide product leadership in the industry ?
2. How do we build our knowledge of consumer desires to enable us to develop market-led products ?
- a. How does R&D take advantage of existing consumer data generated by local markets ?
 - b. What types of qualitative research should R&D be doing to evaluate new product concepts ?
3. Can we develop new products at lower costs which could achieve consumer acceptance equal to present products ?

Strategic Goal Number 5

Address external issues and requirements.

1. How do we confront attacks on PM and our industry based on the presumed health risks of environmental tobacco smoke ?
 - a. What support can PME R&D provide with respect to environmental tobacco smoke ?
 - b. What research can be undertaken which may alter the chemistry of fresh or aged sidestream smoke ?
2. How do we anticipate and satisfy all the regulatory requirements dealing with product safety ?
 - a. What is the optimum strategy for monitoring pesticide residues to deal with regulatory compliance issues ?
 - b. What is the best strategy to support the packaging development efforts ?
 - c. What new government regulations other than environmental regulations can we anticipate during the plan period which will impact our business and require R&D resources ?
 - d. What technical information can be developed which can be utilized to ensure that regulatory decisions are based on the best possible science ?
3. How do we anticipate and satisfy all the regulatory requirements dealing with environmental pressure ?
 - a. What impact will the ECO Audit Program have on R&D ?
 - b. What new environmental regulations can be anticipated during the plan period which will impact our business and require R&D resources ?
 - c. What is the need for new technologies in the field of air scrubbing, water treatment, and waste disposal to comply with forthcoming legislation ?
 - d. How can R&D participate in helping smaller and newer affiliates to monitor their factories with respect to new environmental standards ?

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IV. EXTERNAL ANALYSIS

PM USA R&D

a. General Status

PM USA R&D has undergone and continues to undergo radical changes primarily brought about by required budget cuts as a consequence of sharply decreased earnings due to the reduction of the price of Marlboro. The most obvious of these changes was the result of an early retirement program (the Voluntary Separation Program) which led to the departure of 88 individuals in R&D. Many of these individuals were members of the Senior Technical Staff, and there has been a considerable loss of experience. Other less visible changes have been the elimination of the R&D Quarterly Report, a sharp decrease in the capital budget, a decision to eliminate subscriptions to most journals, substantive changes in the Quarterly Planning Meetings, and cultural changes which have involved considerable staff training (e.g., diversity, team building, and continuous improvement). With the reduction in staff, it will be impossible for PM USA R&D to pursue all of the projects which were in force before the VSP. As might be expected, therefore, there has been considerable activity targeted toward prioritizing current programs. This activity has also had a profound effect on the planning process and may also ultimately effect PME R&D. Both of these points will be discussed in some detail below.

b. PM USA R&D Plan

(1) Introduction

The entire planning process at PM USA R&D has been profoundly altered. The framework based on Strategic Goals which had been in use for many years has been replaced by a framework based on input from Mr. Bill Campbell, President and CEO, PM USA. This framework defines nine programs which will be summarized below. A second major change involves the way in which R&D will function. An Activity Based Management System is being put into place which will essentially convert project management from a functional mechanism to a matrix system. This system will be discussed prior to summarizing the current PM USA R&D Plan.

(2) Activity Based Management System

Activity Based Management intends to combine the advantages of a functional system (Physical Research, Cigarette Development, etc.) with a project system by matrixing the two systems. Functional groups - i.e. Cost Centers - will remain essentially unchanged. Divisional managers, generally those in charge of the cost centers, will primarily be involved in administrative tasks including performance management, personnel education, training, growth management of the technologies represented by the cost center, budgets, safety, diversity, etc. These tasks are all those required by management not associated with co-ordination of technical programs and activities. Technical programs and/or projects which have been identified as being consistent with R&D goals will be established in such a way that their management and co-ordination will be done outside of the cost center system. Each program and/or project will require the identification and formation of teams. The personnel who form these teams

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remain in their assigned cost center; however, in their function as a technical team member, they will ultimately report to a Program Leader. Program Leaders will have the authority and responsibility for planning, developing, managing, and reporting all the technical work of the program. All nine programs have been subdivided into activities, each with an Activity Leader. This system is not new. It is a classic form of matrix management which has been utilized elsewhere over at least a twenty year period. Like any other system of technical management it has its strengths and weaknesses, and it has worked well in some environments and failed in others.

Preliminary to fully establishing this system it is necessary to determine the programs, the activities, and to allocate resources - both personnel and financial. This last endeavor is now in progress at PM USA. Divisional managers have had to complete three different forms. The first of these merely specifies the name of each individual in a given division and lists current activities presently being carried out by these individuals. The second form requires that individuals be allocated to planned programs and activities. The last form attempts to determine required financial resources for each activity for 1994. The results of this exercise will essentially constitute the PM USA R&D Plan for 1994. There is no expectation that a strategic, five-year plan will be written for PM USA R&D this year.

(3) PM USA R&D Programs and Activities

As mentioned above, nine programs have been defined for PM USA R&D to be pursued in 1994. These programs are: Ideal Smoke, Product 98, Beta, Market Driven Product Development, Project Tomorrow, International Product and Process Support, Support other Core Processes, Internal R&D Support, and R&D Processes. Most of these programs are either continuations of previous programs or are self-explanatory. The first two, however, may require some additional discussion. Ideal Smoke includes activities, generally long term in nature, which are targeted to produce the ideal "cigarette" of the future. Product 98 addresses long term issues regarding the current product. Its objective is to define and implement changes which will be made over the next five years. The list below designates all planned activities for each program. For each activity additional information has been defined; namely, the anticipated customer, the supplier, an activity leader, and a major program leader. This additional information is not given.

(a) Ideal Smoke

- New Measurement Techniques (at INBIFO)
- Project Case
- Sidestream Smoke Chemistry
- Project Leap
- Selective Filtration

(b) Product 98

- Reduced Circumference
- CA Tow Optimization
- Paper Specifications and Consolidation
- Project Grain
- Reduced Ingredients

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Cutting Geometry
Strip Dicing
Product 98 Business Systems
Acoustic Randomization
Brica Steam Tunnel Implementation
Individual Component Processing
Low Weight Cigarette Design
Tobacco Fundamentals Studies
Filter Application Development

(c) Beta

Beta Product Development
Beta Test Market Production
Beta Pilot Plant Process Development
Beta Smoke Research

(d) Market Driven Product Development

Package Design
Degradable or Recyclable Cigarette Materials
Degradable or Recyclable Packaging
Packaging Development
Merit Reposition (LSS/LO, Tar)
Minty Menthol
Project Lighthouse
Project Steed
Support to Marketing/Marketing Research
Royce

(e) Project Tomorrow

Fire Safe Cigarettes - Product Development
Fire Safe Cigarettes - Research

(f) International Product and Process Support

CI - Affiliate - Licensee
CI - Japan - Asia
CI - International Product Development
International Region by Region Situation Analysis
Product Launches - Licensees/Affiliates
Product Modifications - Licensees/Affiliates
Support to Licensees, China, India
New Product Launches - Export
Product Modifications - Export
Product Launches - Japan
Product Modifications - Japan
JT Marlboro Blend Modifications
JT Marlboro Lights Menthol Blend
Global Initiatives
Cost Initiatives
International Idea Generation and Consumer Analyses
International Market Analyses

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International Sensory Research
Parliament Pin Perforation
Package Design
Packaging Development
Cast Leaf
NET Start-up BOZ
Short Cycle Impregnation
Fausto

(g) Support Other Core Processes

INBIFO Product/Process Evaluation
Entomological Support
Phosphine Abatement
Microbiological Support
Environmental Support
Pricing Research
INBIFO Information Support
Keep Abreast of Science Information - Regulations
Manage Technical, Regulatory Issues
Litigation Support
Assure Compliance with Existing Regulations
Assure Global Network Regulations/Regulation Modification
TLA
CI - Domestic
CI - Technical Services Special
Week Ending Smoke T&N Analysis (USA)
Week Ending Smoke T&N Analysis (Export)
Export Cigarette Certification
Flavor Specifications
Export Sheet Specification
Analysis for Crop Protection
Moisture Monitoring
Methods Development for Manufacturing
Materials Evaluation, Indirect
Customer Complaint Analysis
Direct Materials Evaluation
Carbon Loading Reductions
Cigarette Specifications
BL Plant Process Specifications
NBL Blending
Processing Plant Support - RL
DCC Installation Support - Manufacturing Center
Existing Primary Modelling

(h) Internal R&D Support

Technical Information
Computer Application Division
CI Pilot Programs
Development Engineering
R&D Finance and Asset Management plus Mailroom
Sensory Research
Data Acquisition and Management

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Consumer Analyses
Cost-Benefit Research
Theoretical and Applied Modelling
Market Analysis
Chemosensory Research and Smoking Behavior
Idea Generation
CI - Domestic Product Development
CI - Process Development Special
CTSD - Lab Standardization ISO-9000
Subjective Smoking Panels
ARD - Methods, QC, Reporting, Maintenance
Process Monitoring
Cigarette Design (Computer Aided)
Paper Technology Support
C and D Pilot Plant Operations
Semiworks
Facility Engineering and Maintenance
Administration - Administrative
Administration - Managerial - Domestic
Administration - Managerial - International

(i) R&D Processes

Security
R&D Planning
Safety, Emergency Response Team
Technology ID, Assessment, Evaluation
Continuous Improvement

c. Potential Impact on PME R&D

It is almost certain that there will be some impact of the changes at PM USA R&D felt by PME R&D. At this time it is not always possible to specify this impact with any certainty. It is likely, however, that it will be more difficult to obtain the same level of support in Richmond that we have previously received. There are a number of more specific changes. The individuals who had organized quarterly competitor patent evaluations have now retired. It appears unlikely that PM USA R&D will continue with these evaluations, and plans are being made to hold such evaluations in Neuchâtel. Most of the work on the evaluation of indirect materials has been transferred from R&D to Quality Engineering. This change will significantly slow down the response time for samples submitted from Europe. As a consequence, we are now investigating the creation of a group to handle such samples locally. There has been some discussion regarding the elimination of all crop protection analyses in Richmond, which would potentially increase our load by 500 analyses per year. The continuation of the Cast Leaf project is in doubt. Only time will tell if the situation in Richmond will affect PME R&D significantly, or if only minor changes will be required.

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Market Trends

An ongoing process has been initiated in R&D this year (1993) to permanently monitor product trends on our markets in order to improve our product concept definition process, contribute to the Philip Morris Product Portfolio Management System, and assist in the identification of trends and opportunities for PM relative to our consumers and our competitors.

One of our objectives in undertaking the four sections under External Analysis - Outside of Philip Morris (Market Trends, Political and Social Trends, Environmental Concerns and Competitive Intelligence) is to build product portfolios of our major brand families and define the modifications desired over the next five years by incorporating external constraints, competitor activities and consumer and social trends. The Product Development Division has implemented systems over the past few years to generate quantitative data on product preference and "liking scores" of key products among selected smoker groups. These systems allow analysis of brand switching, starting and quitting, and provide insight into product performance and price relationships. Including this data into our overall market trends analysis will be one of the exciting aspects of our work during 1994.

For this years R&D Three Year Plan, we include a very global analysis of a few cigarette design parameters to indicate the direction that we will continue to follow and expand in the future. The principal source of data that has been used for this initial analysis is a portion of the Market Fact Report (MFR) data base which has been implemented and is maintained by the PM-EEC Headquarters Marketing Department. We have chosen to concentrate initially on internal Philip Morris data bases in order to derive consistent analyses and conclusions to other departments within the company. Our intention is to collaborate with other internal PM functions like Planning and Marketing Departments, with special emphasis on extracting pertinent information and conclusions for planning and direction of product development and modification activities undertaken by the Product Development Division of R&D. We believe that these efforts will contribute to the initiation and definition of activities for some of the R&D programs, and will assist R&D in effectively collaborating with other headquarters and affiliate departments.

The data and the analyses which follow cover the 8 principal countries of the EEC region where Philip Morris has significant sales volume (Germany, France, Italy, Spain, Greece, Holland, Portugal and Belgium). The following tables show data for 1992 for a few cigarette design parameters (tar segmentation, filter/non-filter/menthol, and length categories) as a profile of these individual markets. We have also attempted to provide an overview of our position (Philip Morris) relative to that of our competitors.

Future work will be directed at completing this western Europe analysis and extending the analysis into some of the principal eastern European countries.

We will also add the historical and current information to these analyses in order to identify and quantify trends which are occurring on these markets.

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The following table is presented as an overview of these 8 EEC countries to provide a context for the data and analyses which follow and to highlight the fact that the EEC is not a uniform and homogeneous market. This "country profile" information clearly needs to be expanded to include "Roll-Your-Own" volumes and a deeper analysis of demographic data for the smoking populations in each country.

	<u>Total</u>	<u>Germany</u>	<u>France</u>	<u>Italy</u>	<u>Spain</u>	<u>Greece</u>	<u>Holland</u>	<u>Portugal</u>	<u>Belgium</u>	
Population (M)	278.6	79.1	57.2	57.8	39.0	10.2	15.1	10.5	10.1	<i>Mio</i>
Tob. Expenditures (M\$)	41.54	12.80	7.44	10.16	5.09	0.81	2.94	0.54	1.76	<i>Bil.</i>
Per capita (\$/y)	149	162	132	176	131	80	196	52	175	
Cigt. Volume (bn)	472.00	133.15	96.31	88.20	80.33	28.18	16.94	15.65	13.24	
Smoking Incidence (%)	28.4	28.5	32.3	23.9	32.0	36.4	21.1		24.4	
Daily Consumption (c/d)	18.2	18.2	17.8	16.5	17.3	23.6	14.6		19.3	

Most of the tables are similarly structured, with a total, then individual countries across the width of the page. The parameter under analysis is categorized vertically to give a matrix overview of the distribution differences across the region. This matrix is generally given with sales volume (billions of cigarettes), and then repeated as country normalized market share (%) values. Values believed to be noteworthy are highlighted and underlined to attract attention to these areas. The presentation of data is followed with some short "bullet-style" highlights to summarize significant conclusions from the data. The "Total" figure reported in these tables is the total of these 8 countries and not the total of the EEC region as reported in other documents.

The first table shows sales volume and market share by country and by manufacturer. This table is the basic linking element between Market Analysis and Competitor Analysis.

This is followed by a matrix of product launch and withdrawal by manufacturer across the 8 countries to highlight new market activities by manufacturer.

The next group of tables takes the tar segmentation domain and successively "drills-down" from a global EEC market overview, through product launch and withdrawal activities, to key manufacturer control of each of the segments.

The final two tables show the regional overview of Filter / Non-Filter / Menthol and cigarette length analysis.

The ongoing process which we have initiated is aimed at extending the analysis down to the brand family or brand level.

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COMPETITOR SEGMENTATION

Year : 1992

Volume (bn)	Total	Germany	France	Italy	Spain	Greece	Holland	Portugal	Belgium
Total :	472.00	133.15	96.31	88.20	80.33	28.18	16.94	15.65	13.24
Total Non-PM :	335.52	85.83	70.15	50.33	68.50	23.44	13.07	14.57	9.62
Philip Morris	136.48	47.32	26.16	37.87	11.83	4.74	3.87	1.08	3.62
Tabacalera	54.51	0.00	0.02		54.49			0.00	0.00
Seita	47.29	1.72	44.13	0.29	0.03	0.04	0.26	0.01	0.81
Monital	42.89	0.01	0.09	42.79	0.00				
Rothmans	41.39	12.08	13.48	2.16	0.26	3.07	5.68		4.67
BAT	39.48	24.03	1.45	2.60	4.29	1.45	3.79		1.87
Reemtsma	33.59	31.65	0.10	0.28	0.14	0.86	0.53		0.04
RJR	30.94	8.99	7.72	1.91	6.38	2.52	2.52	0.13	0.77
Tabaqueira	14.47	0.00	0.04		0.00			14.43	
Other & Generics	16.24	7.36	3.12	0.31	0.20	3.49	0.29		1.47
Papastratos	5.19					5.19			
Karelia	3.98					3.98			
CITA	2.71				2.71				
SEKAP	2.84					2.84			

Market Share (%)

Total Non-PM :	71.1	64.5	72.8	57.1	85.3	83.2	77.2	93.1	72.6
Philip Morris	<u>28.9</u>	<u>35.5</u>	<u>27.2</u>	<u>42.9</u>	<u>14.7</u>	<u>16.8</u>	<u>22.8</u>	<u>6.9</u>	<u>27.4</u>
Tabacalera	11.5	0.0	0.0		<u>67.8</u>			0.0	0.0
Seita	10.0	1.3	<u>45.8</u>	0.3	0.0	0.1	1.5	0.1	6.1
Monital	9.1	0.0	0.1	<u>48.5</u>	0.0				
Rothmans	8.8	9.1	14.0	2.4	0.3	10.9	<u>33.5</u>		<u>35.3</u>
BAT	8.4	18.0	1.5	2.9	5.3	5.2	<u>22.4</u>		14.1
Reemtsma	7.1	<u>23.8</u>	0.1	0.3	0.2	3.1	3.1		0.3
RJR	6.6	6.7	8.0	2.2	7.9	8.9	14.9	0.9	5.8
Tabaqueira	3.1	0.0	0.0		0.0			<u>92.2</u>	
Other & Generics	3.4	5.5	3.2	0.4	0.3	12.4	1.7		11.1
Papastratos	1.1					<u>18.4</u>			
Karelia	0.8					14.1			
CITA	0.6				3.4				
SEKAP	0.6					10.1			

HIGHLIGHTS :

Total Sales volume over the period 1988 through 1992 is relatively flat. Germany is a notable exception due to the East-West unification in 1991. Germany accounts for 28% of total sales. Germany, France, Italy and Spain account for 84%.

PM is clearly the dominant manufacturer across these EEC countries with an overall 29% market share.

Our major competitor in Germany is Reemtsma, whose activities in other countries are insignificant.

As of 1992, the French and Italian monopolies control less than 50% of their respective markets.

For Spain (68%) and Portugal (92%), the market remains under control of the local monopoly: Activities of International Companies remain relatively insignificant. Note that the Spanish market is 5 times as large as that of Portugal.

Rothmans' strongest markets are Holland and Belgium.

BAT is strongest in Holland, followed by Germany and Belgium.

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LAUNCH - WITHDRAWALS (by manufacturer)

Year : 1992

	Total		Germany		France		Italy		Spain		Greece		Holland		Portugal		Belgium	
	L	W	L	W	L	W	L	W	L	W	L	W	L	W	L	W	L	W
Total:	95	83	23	26	26	17	7	17	9	2	14	0	1	12	1	0	14	9
Net :	12		3		9		10		7		14		11		1		5	
Philip Morris	15	8	2	5	5	1	3		3				1	1			1	1
Tabacalera																		
Seita	18	16	5	1	7	11	1	3	1								4	1
Monital	1	3					1	3										
Rothmans	10	13	1	3	4	1	1	1	1	2	1		3				2	3
BAT	5	13	1	1	1		3				2		8				2	
Reemtsma	5	6	3	5					1		1							1
RJR	7	4	2	1	2	1	1	2	1		1							
Tabaqueira	1	1			1										1			
Other & Generics	27	19	9	10	8	1	5				5						5	3
Papastratos	2										2							
Karelia	1										1							
CITA	2								2									
SEKAP	1										1							

[Notes: L= Launches; W=Withdrawals]

HIGHLIGHTS :

Philip Morris is expanding its brands in France, Italy and Spain, and repositioning or consolidating brands in other countries. It has the largest net increase in brands of all manufacturers across the region (except for "Other and Generics").

Seita is introducing brands in Germany and Belgium, but repositioning or consolidating brands elsewhere. They have a relatively large net negative activity in France.

Monital, effectively present only in Italy, is reducing brands.

Rothmans appears to be attempting to increase market activity in France, and reducing their brand portfolio or repositioning brands in other countries.

BAT significantly reduced the number of brands in Holland, their strongest market.

Reemtsma is reducing and repositioning brands in Germany.

RJR is repositioning and adding brands in most of the markets.

"**Other and Generics**" are clearly the most active "manufacturers" with a very large number of introductions (28% of total), but also a large number of withdrawals. Absence of activity in Holland is noteworthy. France, followed by Germany are the most active markets for these products.

Papastratos, **Karelia**, **CITA** and **SEKAP** continue to introduce brands in Greece.

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TAR SEGMENTATION**Year : 1992**

<u>Volume (bn)</u>	<u>Total</u>	<u>Germany</u>	<u>France</u>	<u>Italy</u>	<u>Spain</u>	<u>Greece</u>	<u>Holland</u>	<u>Portugal</u>	<u>Belgium</u>
Total :	472.00	133.15	96.31	88.20	80.33	28.18	16.94	15.65	13.24
Full Flavor	360.03	104.74	66.06	54.78	73.46	23.06	13.55	13.62	10.76
Lights	69.35	13.56	16.71	24.61	6.44	3.50	1.69	1.69	1.15
Super Lights	28.74	11.45	8.24	6.20	0.32	0.86	0.36	0.34	0.98
Ultra Lights	13.88	3.41	5.31	2.61	0.11	0.75	1.34	0.00	0.35

Market Share (%)

Full Flavor	<u>76.3</u>	78.7	68.6	62.1	<u>91.5</u>	81.8	80.0	<u>87.0</u>	81.3
Lights	14.7	10.2	<u>17.3</u>	<u>27.9</u>	8.0	12.4	10.0	<u>10.8</u>	8.7
Super Lights	6.1	8.6	<u>8.6</u>	7.0	0.4	3.1	2.1	2.2	7.4
Ultra Lights	2.9	2.6	<u>5.5</u>	3.0	0.1	2.7	<u>7.9</u>	0.0	2.6

HIGHLIGHTS :

There is a clear tendency in these EEC countries toward lower-delivery cigarettes. Overall, the Full-Flavor segment has decreased from 81% in 1988 to 76% in 1992.

Italy, followed by France, are ahead of the rest of the EEC countries in this low-tar trend. Spain and Portugal, with their strong monopolies and local-taste brands are clearly the last of these countries to follow this trend.

Holland maintains a large Full-Flavor smoking population, but light-delivery smokers seem to select the Ultra-Light category over Lights and Super Lights. This is explainable by the positioning of Barclay which still competes in the Ultra Light segment (approximately 5% market share).

Smokers are "switching down" to successively lighter categories, but Full-Flavor products still strongly dominate the EEC marketplace. For perspective, two cartons of Full-Flavor cigarettes are sold for every pack of Ultra-Lights.

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LAUNCH - WITHDRAWALS

Year : 1992

Brand Count	Total	Germany	France	Italy	Spain	Greece	Holland	Portugal	Belgium
Total Brands :	1516	322	227	216	158	167	211	26	189
Full Flavor	1003	218	133	116	108	121	153	17	137
Lights	320	62	49	56	43	28	40	7	35
Super Lights	126	33	29	30	5	11	7	2	9
Ultra Lights	67	9	16	14	2	7	11	0	8
Launches									
Total :	95	23	26	7	9	14	1	1	14
Full Flavor	49	13	15	1	5	8	1	0	6
Lights	26	8	5	1	4	3	0	0	5
Super Lights	13	2	4	4	0	1	0	1	1
Ultra Lights	7	0	2	1	0	2	0	0	2
Withdrawals									
Total :	83	26	17	17	2	0	12	0	9
Full Flavor	62	20	14	11	1	0	9	0	7
Lights	16	6	1	4	0	0	3	0	2
Super Lights	3	0	1	1	1	0	0	0	0
Ultra Lights	2	0	1	1	0	0	0	0	0
Net Activity									
Total :	12	-3	9	-10	7	14	-11	1	5
Full Flavor	-13	-7	1	-10	4	8	-8	0	-1
Lights	10	2	4	-3	4	3	-3	0	3
Super Lights	10	2	3	3	-1	1	0	1	1
Ultra Lights	5	0	1	0	0	2	0	0	2

HIGHLIGHTS :

The very large number of total brands (1516) is overstated by multiply counting regional brands which are effectively identical across various countries. Note that Holland and Belgium, which have relatively small market volumes, are in 4th and 5th position with respect to the number of brands present (heavy concurrence for market share).

The major new launch activities are clearly in the lighter delivery categories, with a slow reduction in the number of Full Flavor brands on the market. Full Flavor brands however still represent from 54% to 73% of the brands present on these markets.

Italy is notable with a net increase in only the Super-Lights category. Conversely, Holland seems to be consolidating activities with a significant net withdrawal activity. Belgium, despite its abnormally high number of brands for the relatively small market, had a significant new launch activity across all lower tar delivery categories.

Overall, EEC activity is relatively stable (withdrawals = launches), which is probably due to limited "shelf-space". Notable exceptions are Italy and Holland with net consolidation of brands, while France, Spain, Greece and Belgium show an overall increase in the number of brands.

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TAR SEGMENTATION BY KEY MANUFACTURERS **YEAR :1992**
(Larger EEC Countries)

	<u>FULL FLAVOR</u>			<u>LIGHTS</u>			<u>SUPER LIGHTS</u>			<u>ULTRA LIGHTS</u>		
	Volume	Brds	V/Br	Volume	Brds	V/Br	Volume	Brds	V/Br	Volume	Brds	V/Br
<u>Germany</u>	104.74	218	0.48	13.56	62	0.22	11.45	33	0.35	3.41	9	0.38
Philip Morris	39.15	19	<u>2.06</u>	1.37	8	0.17	<u>6.69</u>	4	<u>1.67</u>	0.12	1	0.12
Reemtsma	25.00	36	0.69	2.11	10	0.21	2.61	5	0.52	<u>1.94</u>	2	<u>0.97</u>
BAT	20.44	33	0.62	1.99	7	0.28	0.88	6	0.15	0.72	2	0.36
Rothmans	4.53	23	0.20	<u>6.90</u>	9	0.77	0.02	2	0.01	0.63	4	0.16
Share	85%	51%		91%	55%		89%	52%		100%	100%	
 <u>France</u>	 66.06	 133	 0.50	 16.71	 49	 0.34	 8.24	 29	 0.28	 5.31	 16	 0.33
Seita	30.51	43	0.71	7.25	12	0.60	3.05	7	0.44	3.33	6	0.55
Philip Morris	17.86	15	1.19	4.91	10	0.49	2.30	3	0.77	1.09	2	0.55
Rothmans	8.44	22	0.38	2.14	9	0.24	2.31	6	0.39	0.58	2	0.29
Share	86%	60%		86%	63%		93%	55%		94%	63%	
 <u>Italy</u>	 54.78	 116	 0.47	 24.61	 56	 0.44	 6.20	 30	 0.21	 2.61	 14	 0.19
Monital	32.66	28	1.17	6.98	14	0.50	2.19	5	0.44	0.96	2	0.48
Philip Morris	19.32	17	1.14	14.19	16	0.89	3.23	11	0.29	1.13	5	0.23
Share	95%	39%		86%	54%		87%	53%		80%	50%	
 <u>Spain</u>	 73.46	 108	 0.68	 6.44	 43	 0.15	 0.32	 5	 0.06	 0.11	 2	 0.06
Tabacalera	48.66	21	<u>2.32</u>	5.62	9	<u>0.62</u>	0.21	1	<u>0.21</u>			0
Philip Morris	11.62	11	1.06	0.20	5	0.04	0.02	1	0.02			0
RJR	6.28	11	0.57	0.10	2	0.05		0				0
Share	91%	40%		92%	37%		72%	40%		<u>0%</u>	0%	

[Note: V/Br= average Volume per Brand]

Volume in billions / year

HIGHLIGHTS :

General: PM generally has one principal competitor in each of the markets.

Germany: The two major competitors (PM & Reemtsma) control the market except for the Lights segment. This niche is predominantly controlled by Rothmans, which does not compete well in the other segments. Noteworthy is the performance (Volume per Brand) of PM in the Full-Flavor and Super-Lights segments, and Reemtsma in the Ultra-Lights.

France: PM and Seita control all segments of the market (65% to 83%). With Rothmans, all segments are monopolized (86% to 94% of market).

Italy: All segments are highly controlled (80% to 95%) by the two major players (PM and Monital). BAT, Rothmans and RJR fight about equally for the remaining market shares.

Spain: Ultra-Lights is approximately non-existent, and certainly for the 3 major players in this market. PM and Tabacalera leave little space for the other three principal manufacturers. Tabacalera has high performance brands in all three segments present, with PM only competing in the Full-Flavor segment.

TAR SEGMENTATION BY KEY MANUFACTURERS

YEAR :1992

(Smaller EEC Countries)

	FULL FLAVOR			LIGHTS			SUPER LIGHTS			ULTRA LIGHTS		
	Volume	Brds	V/Br	Volume	Brds	V/Br	Volume	Brds	V/Br	Volume	Brds	V/Br
<u>Greece</u>	23.06	121	0.19	3.50	28	0.13	0.86	11	0.08	0.75	7	0.11
Papastratos	4.69	10	0.47	0.47	3	0.16	0.04	1	0.04	0.00	0	
Philip Morris	4.16	4	<u>1.04</u>	0.53	4	0.13	0.05	1	0.05	0.00	0	
Karelia	3.95	14	0.28	0.00	0		0.00	0		0.03	1	0.03
Share	55%	23%		29%	25%		<u>10%</u>	18%		<u>4%</u>	14%	
<u>Holland</u>	13.55	153	0.09	1.69	40	0.04	0.36	7	0.05	1.34	11	0.12
Rothmans	5.11	49	0.10	0.30	14	0.02	0.20	4	0.05	0.07	2	0.04
Philip Morris	3.09	17	0.18	0.64	4	<u>0.16</u>	0.09	1	0.09	0.06	1	0.06
BAT	2.19	41	0.05	0.43	11	0.04	0.02	1	0.02	<u>1.15</u>	7	<u>0.16</u>
Share	77%	70%		81%	73%		85%	86%		95%	91%	
<u>Portugal</u>	13.62	17	0.80	1.69	7	0.24	0.34	2	0.17	<u>0.00</u>	0	
Tabaqueira	12.73	12	1.06	1.37	4	0.34	0.34	2	0.17	0.00	0	
Philip Morris	0.77	1	0.77	0.30	1	0.30	0.00	0		0.00	0	
Share	99%	76%		99%	71%		99%	100%				
<u>Belgium</u>	10.76	137	0.08	1.15	35	0.03	0.98	9	0.11	0.35	8	0.04
Rothmans	4.09	47	0.09	0.35	9	0.04	0.08	2	0.04	0.14	2	0.07
Philip Morris	3.00	15	<u>0.20</u>	0.44	6	0.07	0.12	2	0.06	0.06	1	0.06
BAT	0.88	25	0.04	0.08	5	0.02	<u>0.78</u>	3	<u>0.26</u>	0.14	4	0.03
Share	74%	64%		76%	57%		99%	78%		98%	88%	

[Note: V/Br= average Volume per Brand]

HIGHLIGHTS :

Greece: This is a market with many players and no dominant competitor. The three major manufacturers control only half of the Full-Flavor and a third of the Lights segments. PM has some relatively high performance brands in the Full-Flavor segment, but the Super-Lights and Ultra-Lights are controlled by non-major players.

Holland: PM and Rothmans, the two major players, only control 55% to 79% of the first three segments, with very poor representation in the Ultra-Lights area. PM has a high performance portfolio in the Lights segment, where Rothmans is especially weak with a large number of brands. The Ultra-Lights category is clearly controlled by BAT.

Portugal: Tabaqueira and PM essentially control the market (99% in the first three segments). Ultra-Lights are non-existent.

Belgium: A relatively open market with many players. The top three have three-fourths of the Full-Flavor and Lights segments, with PM having good performing brands in the Full-Flavor segment. The Super-Lights segment is controlled by BAT, which also has 40% of the Ultra-Lights segment.

FILTER AND MENTHOL SEGMENTATION

Year : 1992

<u>Volume (bn)</u>	<u>Total</u>	<u>Germany</u>	<u>France</u>	<u>Italy</u>	<u>Spain</u>	<u>Greece</u>	<u>Holland</u>	<u>Portugal</u>	<u>Belgium</u>
Total :	472.00	133.15	96.31	88.20	80.33	28.18	16.94	15.65	13.24
Filter	441.48	126.34	79.21	86.50	80.08	27.31	14.57	15.17	12.31
Non Filter	30.51	6.82	17.10	1.69	0.25	0.87	2.37	0.48	0.93
Non Menthol	465.55	131.74	92.76	87.94	79.93	28.14	16.27	15.64	13.13
Menthol	6.44	1.41	3.55	0.26	0.39	0.04	0.67	0.01	0.10

Market Share (%)

Filter (Non-Menthol)	92.2	93.8	78.6	97.8	99.2	96.8	82.0	96.9	92.2
Filter (Menthol)	1.4	1.1	3.7	0.3	0.5	0.1	4.0	0.1	0.8
Non Filter	6.5	5.1	17.8	1.9	0.3	3.1	14.0	3.1	7.0

HIGHLIGHTS :

Menthol cigarettes have poor popularity throughout the EEC. France (3.7%) and Holland (4.0%) are effectively the sole markets for these products. These two markets also continue to maintain a significant customer base for Non-Filter cigarettes. Belgium and Germany go somewhat in the same direction whereas the other countries are clearly filter, non-menthol markets.

CIGARETTE LENGTH

Year : 1992

<u>Volume (bn)</u>	<u>Total</u>	<u>Germany</u>	<u>France</u>	<u>Italy</u>	<u>Spain</u>	<u>Greece</u>	<u>Holland</u>	<u>Portugal</u>	<u>Belgium</u>
Total :	472.00	133.15	96.31	88.20	80.33	28.18	16.94	15.65	13.24
Regular Size	44.47	1.75	23.68	1.63	0.24	0.84	2.26	7.40	6.65
Long Size	46.32	12.93	4.43	0.06	22.30	3.76	0.21	2.48	0.15
King Size	349.14	105.93	63.73	76.58	57.22	20.61	13.49	5.77	5.81
Longer than KS	6.97	2.03	2.01	1.89	0.18	0.52	0.15		0.18
100's	23.60	10.16	1.99	7.92	0.36	1.96	0.80		0.41
120's	1.49	0.35	0.47	0.11	0.03	0.49	0.02		0.03

Market Share (%)

Regular Size	9.4	1.3	24.6	1.9	0.3	3.0	13.3	47.3	50.3
Long Size	9.8	9.7	4.6	0.1	27.8	13.3	1.3	15.8	1.2
King Size	74.0	79.6	66.2	86.8	71.2	73.2	79.6	36.9	43.9
Longer than KS	1.5	1.5	2.1	2.1	0.2	1.8	0.9	0.0	1.3
100's	5.0	7.6	2.1	9.0	0.4	6.9	4.7	0.0	3.1
120's	0.3	0.3	0.5	0.1	0.0	1.7	0.1	0.0	0.2

HIGHLIGHTS :

King Size is clearly the dominant length class across EEC countries.

Portugal, with its strong monopoly control, has no cigarettes longer than King Size, and is still dominated by the Regular Size category.

Regular Size continues to be an important segment in the Belgium and French markets.

Note that Italy has almost no Long Size sales.

Competitive Intelligence

a. EEC

(1) Introduction

The major markets within the EEC Region are Germany, Italy, France, Spain, Belgium/Luxembourg, and the Netherlands. (Although the UK must certainly be considered a major market with respect to sales, it will not be considered in this plan, since it is basically an all Virginia market, and PM Europe has only a small market share.) Total year-to-date sales through October, 1993, for these six countries are 350.5 billion units. Eight companies account for 99.2% of these sales. These companies, and their respective market shares are as follows:

<u>Company</u>	<u>Sales(bn)</u>	<u>Share</u>
PM	119.1	34.0%
Tabacalera	41.6	11.9%
SEITA	39.8	11.4%
Rothmans	33.0	9.4%
BAT	32.6	9.3%
Monital	31.0	8.8%
Reemtsma	27.5	7.8%
RJ Reynolds	23.3	6.6%
Total	347.9	99.2%

(It is interesting to note that the two companies with largest market share next to PM Europe in these six countries are two of the monopolies; namely, Tabacalera and SEITA. Both concentrate essentially their sales on their home markets. As will be discussed below, both companies are, however, becoming quite aggressive with respect to exporting.) The seven companies listed above must be considered our major competitors within the EEC, and each one will be briefly analyzed in the following sections.

The figures above clearly establish the pre-eminence of PM Europe within the EEC Region (as defined for this discussion). However it is essential to point out that most of our major competitors in this Region are aggressively seeking to increase market share, and some of them have been quite successful with respect to new product introductions. New product sales during the first 10 months of 1993 expressed as a percentage of products introduced by the eight companies above in 1992 and 1993 are as follows: PM, 42.1%; RJ Reynolds, 28.0%; Rothmans, 14.9%; SEITA, 7.0%; Monital, 5.7%; BAT, 1.7%; and Reemtsma, 0.6%. (New product introductions by Tabacalera were negligible.) Clearly PM Europe has done extremely well regarding new product introductions. However, it must be pointed out that these figures are skewed by the fact that 69.0% of all new product sales during this year were within one country (France), and PM Europe had 54% of these sales. It was pointed out in last year's plan that it is essential for PM Europe to actively introduce new products if it intends to maintain its dominance in the EEC Region. PM's active new product program in the past twelve months has certainly demonstrated that it intends to do just that. However, there is a clear threat which can be found in the sale of new products in 1993; namely, the rapid growth of "price value" products. Chesterfield International in France has achieved a 3.9% market share; Winston KS in France now has a 3.4% market share; and Gold Coast

(RJR) has reached 3.2% of the market in Spain. These are unusually large penetrations for brands barely one year old, and demonstrate the willingness of many consumers to sacrifice some quality for cost. The competitor which clearly is spearheading this trend is RJR. This will be discussed in more detail below.

(2) Tabacalera

(a) General Information

In 1993, Tabacalera, the Spanish monopoly, held a 65.9% market share in Spain (down 1.7 share points from the previous year) and an 11.9% share in the EEC region as defined above, despite the fact that the vast majority of its sales are solely in Spain. Cigarette sales in Spain for the first 10 months of 1993 were 55.4 billion units, a decline of 10.0% from the 61.6 billion units sold in the first 10 months of 1992. This is the consequence of a sharp price increase that has also given renewed importance to the sale of contraband cigarettes. These sales are estimated to represent 16 to 18% on the total market, costing Tabacalera about 70 billion pesetas in lost sales. This situation should change since as of September 1993, cigarettes are being manufactured with a special label showing that they are legal and taxed. Sales of Tabacalera brands were 36.6 billion units during the first 10 months of 1993, a decrease of 12.3% from the same time period in 1992. Financially, Tabacalera continues to do well. Although sales in 1992 edged down slightly to 489.82 billion pesetas from 503.94 in 1991, pre-tax profits increased by 3.5% to 20.06 billion pesetas.

Tabacalera owns 50% of Philip Morris Espana and 50% of BAT Espana. In 1991 entered into a 50-50 joint venture with RJ Reynolds allowing Reynolds to manufacture and sell Winston and Camel cigarettes in Spain. Under this agreement, the RJ Reynolds plant in La Palma, Canary Islands, and its employees become part of the venture. Tabacalera sold to Reynolds a 50% stake in Grupo Royal Brands SA, its food unit, for 17.25 billion pesetas. The group will be renamed RJR Alimentacion. Tabacalera also owns 100% of Compania de Filipinas, a Spanish leaf export and import company, 20% of Compania Espanola de Tabaco en Rama (a company established in 1987 for the purposes of buying, processing, and commercialising Spanish Tobacco), 93% of Tabapress and 100% of Tabapack. Tabacalera has also invested 3.63 billion pesetas in the Spanish sugar company Ebro Agrícolas.

(b) Major Products and New Product Activity

Tabacalera has the two largest brand families on the Spanish market, Ducados and Fortuna, with 1993 market shares of 28.8 and 25.0%, respectively. Market share of Ducados has remained constant, while market share of Fortuna has declined by 1.8 share points. Ducados is a dark blended, whereas Fortuna is an American blended cigarette. Other significant Tabacalera brands are Celtas, with a 1993 market share of 3.2%; B.N., with a 1993 market share of 3.0%; Nobel, with a 1993 market share of 2.5%; and Habanos, with a 1993 market share of 1.7%. Tabacalera's only new product introductions into the EEC Region were in France. Both Ducados Legère KS Box and Ducados Rubio Lights KS Box were introduced in May, 1993. However, total sales for both brands has only been 2.7 million units through October, 1993.

(c) Technology Assessment

Tabacalera is not a high technology company. They have a small R&D laboratory consisting of about 60 people located in Madrid and headed by M. P. Magro. The main activities of this laboratory are quality assurance, product development including a pilot plant, chemical analysis of tobacco blends, and a cigarette information laboratory. During the period from January 1, 1992 to October 1, 1993, Tabacalera had no patents. Its scientists did publish some technical articles and gave several oral presentations regarding tobacco smoke sensors. This work was a collaboration between Tabacalera and local Universities.

(d) Strategies for Growth

Tabacalera is a sizeable company. It is among the 10 largest tobacco companies in the world, and is the fourth largest company in Spain. It has managed to dominate the cigarette business in Spain, not only because of the fact that it is a monopoly, but also because of its complete control of the tobacco distribution network in Spain. The extent to which Tabacalera controls the distribution of tobacco products has deterred any competitor from trying to establish an independent system. Although in theory Tabacalera will have to be privatized in line with EC policy, the Spanish government appears to be in no hurry to do so. Recently, Don Perez, former deputy minister of Economy, succeeded German Calvillo Urabayen as CEO of Tabacalera. This change could well be the first step in privatization.

Despite its long-time domination of the Spanish market, Tabacalera has had virtually no export business. In 1991 Tabacalera exported less than 1% of its total cigarette production, and in financial terms, such exports were worth much less than 1% of sales. The target of the recently appointed director of export trading, R. Muguiro, is to export about 10-15% of Tabacalera's output. Traditionally, the monopoly has exported only to France, Austria, Germany, and the UK, and virtually all of the export business was targeted to Spaniards working abroad. Mr. Muguiro plans to specialise in two areas, namely, own-label brands and bulk cigarettes. Initial attempts to develop the own-label business will be in the UK, since the own-label business is fully developed in the UK. No contracts have been signed at this time, but plans are to aim for contracts in 1993 and 1994.

Tabacalera had previously indicated that it is not interested in exporting to the Eastern European countries because of the presence of the multinational cigarette companies there. In addition, the lack of any centralised distribution structures makes it a difficult region to effectively compete in. However, recent events in 1993 would tend to contradict that expressed intention. Tabacalera has recently begun to manufacture Winns, a cigarette for export to the Eastern countries, and Laser, which is being exported to Russia. It is possible that lower wage scales in Spain may allow Tabacalera to compete in Eastern Europe through export despite the lack of a distribution system.

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(3) SEITA

(a) General Information

SEITA, the French tobacco monopoly, remained the market leader in France during the first ten months of 1993 with a 44.0% market share. Compared to the same period of 1992, SEITA has registered a loss of 1.8 share points, and unit sales of 2.7 billion. For the total of 1992, SEITA sold 44.1 billion units on its domestic market, off one billion from the previous year, with a market share of 47.3%, 0.7% less than in 1991. The company has compensated its domestic downturn by aggressive export activity. International sales increased to 11.4 billion in 1992, of which 3.2 billion went to EEC countries. This represents an increase of 9% over 1991. International sales now account for about 20% of SEITA's total cigarette sales volume. In 1993, international sales are projected to exceed 13 billion. Licensing has increased sharply for SEITA's trademarks, with 22 agreements in force in 1992 as opposed to 13 in 1990.

Financially, 1992 was an excellent year for SEITA with earnings, (including investment earning) increasing by 44% to 590 million French francs. Taking account of a lower level of provisions and tax losses carried over, net earnings were 350 million francs. For the first semester of 1993, profits were 232 million francs, up 38% over the same period of the previous year, and turnover rose to 6.67 billion francs.

The monopoly is due to be privatised in the coming years, the date being fixed essentially by conditions on the financial markets and the emergence of suitable buyers. Reemtsma, Bolloré and BAT have all expressed interest in the acquisition of at least a portion of the monopoly. The Président-Directeur of SEITA, Mr. B. De Gallé, was replaced by Mr. J.D. Comolli, who used to be Directeur Général customs at the Budget Ministry. As was the case for Tabacalera, this has been interpreted as the first step in the privatization process.

After closing its Dijon factory this year, SEITA has five factories in which cigarettes are manufactured. These are located in Lille, Nantes, Riom, Tonneins and Châteauroux. SEITA has had a multi-year program designed to improve factory productivity which was reported to have increased by 13% over the period 1988-1991. At the same time, total employment decreased from 7000 to 5700. The Lille facility ranks first among the factories, and it is the most modern. The Nantes facility (11 billion cigarettes produced in 1992, reserved for large production runs) was upgraded by replacing existing equipment and expanding it. Over the 1992-1993 period, 115 million francs were invested in this factory. Investments reached 100 million francs in the Riom factory over 1991-92. The factory production should be 10 billion units in 1993 (from 8 in 1991) on 30 makers, including in 1993, two higher speed makers (7200 cig/min.). This factory is dedicated to small production runs for export products or products manufactured under licence (hence the slower makers). To improve its flexibility, a novel computerised system for production scheduling was developed (ortems). The processing capability for brown tobacco in Tonneins was doubled at a cost of 42 million francs.

SEITA also invested 35 million francs in the tobacco handling and storage facility in Le Havre (the largest in Europe: 45'000 tons of stored tobacco) to

automate the processes. In particular, a computer-based vision system is being implemented to screen incoming tobacco; development costs were \$ 200,000.

(b) Major Products and New Product Activity

A total of 78.0 billion cigarettes were sold in France during the first 10 months of 1993. Dark cigarettes accounted for 23.4 billion, a drop of 8.0% versus the same period of 1992. Although sales of blond cigarettes also decreased by 0.7 billion units, market share of blond cigarettes increased by 1.5. In that essentially all dark cigarettes sold France are SEITA trade marks, the company has been extremely active, and successfully so in the past, in growing sales of its two major blond brands, Gauloises and Gitanes. However, as a consequence of sharp tax increases in the past twelve months, both brands have declined. Gauloises, still the number one brand with 29.1% of the market, had a market share decline of 0.4 share points during the first 10 months of 1993. Gauloises Black decreased by 0.6 share points, while Gauloises Blondes increased by 0.3 share points, although sales of Gauloises Blondes declined by 0.5%. Gitanes, SEITA's number two brand, experienced a much larger decline. The total brand fell from 10.1% of the market in the first 10 months of 1992 to 9.1% in the same time period for 1993. Market share of both the black and blond versions fell, with a 0.7 share point decline for Gitanes Black, and a 0.3% decline for Gitanes Blondes. SEITA's Royale family, its only other major brand, had a 4.0% market share in 1993.

SEITA has been quite active in new product launches within France, as well as in other EEC markets. In France, four new products were launched by SEITA in 1992, while five launches have taken place to date in 1993. Gauloises Blondes Ultra Light, launched in March, 1992, had 1992 sales of 504 million units and year-to-date sales of 596 million units. SEITA's first 25's pack, News KS Box, introduced in October, 1992, has also been reasonably successful with 1993 sales to date of 390 million units. In February 1993, News Lights was introduced, also in a 25's pack. The company has also recently begun to introduce a number of innovative products. Fine 120 menthol was launched in June, 1993, while in September, 1993, two distinctively flavored cigarettes were marketed - Royale Legère Anis KS and Royale Legère Pêche Abricot KS. It is far too early to determine if these innovative products will be successful; however, SEITA has demonstrated that it is willing to bring new technology to the market.

SEITA has been quite active with respect to new product introductions in other Western European countries as well. Five new products were launched in Germany during 1992, six new products were launched in Belgium, four in 1992 and two in 1993, while three products were launched in Italy, one in 1992 and two in 1993. None of these new product introductions has been an instant success; however, total 1993 year-to-date volume has been 230.2 million units. The most successful introduction outside France has been Gauloises Blondes KS Box 25's in Belgium with year-to-date sales of 105 million units.

Because of the two large tax increases that shook the French market in the first months of 1993, and the ensuing price war, the French market is quite different this year from what it was in 1992. An opportunity to provide lower priced brands was created, and those companies which had an established presence on the French market have taken advantage of the situation. A total of 10.1 billion units, almost 13% of the total market, sold through October 1993 are

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lower priced brands which were introduced in late 1992 or early 1993. SEITA has actually lagged behind the multinational companies with only 790 million new product sales, compared to 5.47 billion for PM, 1.96 billion for Reynolds, and 1.84 billion for Rothmans.

(c) Technology Assessment

SEITA has a fairly sizeable research and development effort. Their R&D division totals about 350 employees located in Les Aubrais. This laboratory contains facilities for QA, product development, process development, research, and engineering. A central office is located in Paris which houses the head and co-ordination of research, the Leaf department, and New-Products development. SEITA also owns part of the Tobacco Research Institute in Bergerac together with the INRA (Institut National de Recherche Agronomique) and growers associations. The R&D budget was quoted in 1992 as being 150 million francs by its research director P. Schiltz.

In an interview, Mr. Bertrand de Gallé, former Président-Directeur of SEITA, indicated that expenses for R&D had increased by 40% between 1988 and 1992. This would suggest significant addition of head-count over that period of time. SEITA has done a considerable amount of research work directed toward the development of new varieties of tobacco. One published accomplishment is the development of a new kind of dark tobacco that is able to resist Bromoxynil, a weed killer used after planting. This tobacco is expected to be in commercial use in 1994, and there are plans to develop a light variety. Another recent endeavour was the expenditure of 130 million French francs for research on the modification of Gauloises and Gitanes to bring them in line with the EC Directive on tar limits.

SEITA has an important agreement with Rhône-Poulenc to conduct research on tobacco genetics to develop disease resistant plants. It has also developed a new overwrap film in co-operation with ICI. Despite SEITA's obvious commitment to research and development, they have not been as active with respect to patents as tobacco companies with comparably sized research efforts. Because for a long time they were concentrating on the French market, they have a tradition of resorting to the "Enveloppe Soleau" to protect their intellectual property in France without disclosure. As a consequence, it is difficult to obtain a good picture of SEITA's technological strengths and weaknesses. Since the beginning of 1992, SEITA did file 6 different patents: a cigarette pack design, an optical system for the measurement of cigarette diameter and a smoking machine, a new material for filter tips and an aromatic sheet material, and a new tobacco plant with increased resistance to black root rot.

(d) Strategies for Growth

SEITA has become extremely aggressive during the past few years with respect to increasing their presence outside France. Their strategy for expanding their export business initially had three parts. Their first approach was to market their current brands in other Western European countries; their second was to pursue ownership of factories in Eastern Europe; and lastly they are attempting to obtain access to the other overseas markets. With respect to the first approach, SEITA continues to be aggressive. Their activity in other EC

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countries was outlined above and has led, in 1993, to an additional 230 million units. In addition SEITA continues to target the Swiss market.

With respect to non-European markets, SEITA established a new company, Coralma International, jointly owned by Bollore Technologies Group (60%) and SEITA (40%) to market cigarettes in French speaking Africa and Madagascar. SEITA also targets English-speaking Africa, and distribution of Gauloises in South Africa has seen encouraging results. The African market accounts for 25% of SEITA's exports. In Latin America, SEITA has signed an agreement with the Mexican cigarette company, Cigarrera la Moderna, a former BAT subsidiary, to produce Gitanes Blondes which have been introduced in Colombia as well. Another promising market is Argentina, where SEITA has a 2.5% market share with its Parisienne brand. SEITA has begun to export to the Far East as well. The fine brand is steadily gaining ground in south-east Asia, and Gitanes Blondes have recently been launched in Japan under a licence granted to Japan Tobacco.

SEITA has recently announced that they are no longer going to attempt to acquire factories in Eastern Europe. Their only current ownership in Eastern Europe is 17.7% of Tobacna Ljubljana in Slovenia (Reemtsma owns most of the remainder), and they appear to have decided that they cannot compete in this arena with the multinationals. SEITA will continue, however, to export to Eastern Europe. The company exported 200 million cigarettes to Romania in 1992, and Gauloises Blondes are manufactured under licence in Hungary. Negotiations are underway for licensing in Poland and Slovakia.

It is obvious that SEITA considers increasing its exports as a major priority. Gauloises, and to a lesser extent Gitanes, are well known brands with considerable brand image. One or both of these brands could quickly gain international stature and become true competition for Marlboro. Sales of Gauloises in Western Europe have grown significantly during the previous year, and further growth is likely. It is clear that SEITA is a competitor which bears close scrutiny.

(4) Rothmans

(a) General Information

Rothmans is a multinational cigarette company with 9.4% of the Western European market as defined above. Rothmans is particularly strong in the Netherlands and Belgium where it holds 33.0% and 30.7% of the market, respectively. It also has respectable market shares in France (12.2%) and Germany (8.7%). Its market share in Italy is quite low (2.5%) and virtually non-existent in Spain. Rothmans Inc. reported that earnings for the fiscal year ending 31.3.93 increased by 12.1% to \$55.3 millions, and its earnings from tobacco operations, after provision for minority interests (for Rothmans' 50%-quoted companies in Malaysia and Australia), went up by 12.6% to \$53.4 millions. Concerning the first half ending September 1993, it should be noted that the profits of Rothmans International, the restructured tobacco group, were up because of favourable exchange rates: operating profits rose 8.6% to £212.6 million on net sales of £1.22 billion, a gain of 12£%. Pre-tax profits, boosted by £29 million from currency translation, rose from £209.3 million to

£233.4 million. This rise came in spite of a 9% decline in world-wide cigarette sales. Much of this overall decline was accounted for by lower sales in the UK, France, and the former Yugoslavia. Profits in Western Europe were also hit by taxation changes in Germany and rationalisation costs of £16.7 millions, mainly in Belgium. Volumes in the Philippines were significantly lower due, in part, to the closure in December 1992 of Alhambra Industries.

Rothmans has undergone a major restructuring in 1993. The company has completely separated its two major businesses - tobacco and luxury products. The tobacco company retains the name Rothmans while the luxury product business will be called Vendome. Previously, Rothmans included both the tobacco business and the Cartier trademark, while a separate company, Dunhill, was involved in luxury products not including Cartier. Stock in both companies - Rothmans and Dunhill - will be redeemed as follows. Every 1000 shares of Rothmans will be exchanged for 1000 shares of New Rothmans, 500 shares of Vendome, and \$757. Every 1000 shares of Dunhill will be exchanged for 133 shares of New Rothmans, 749 shares of Vendome, and \$433. Response by financial analysts to this restructuring has been quite positive. It should be noted that Richemont, the Swiss holding company, will remain as majority holders in both companies, with ownership of 61% of New Rothmans and 70% of Vendome.

(b) Major Products and New Product Activity

As pointed out above, Rothmans has significant market share in the major Western European countries with the exception of Italy and Spain. Major brand families in the Netherlands are Caballero (12.0% market share), Peter Stuyvesant (8.3%), Pall Mall (5.0%), Tivoli (1.7%) and Dunhill (1.5%). All of these brands have shown declines in market share in September, 1993, compared to the previous year except for Tivoli (0.1 market share increase). Rothmans has introduced three new products into the Netherlands in 1993. Roxy Dual Mild KS Box 25's, introduced in February, had sold 44.9 million units through October, 1993, while Roxy Dual Extra Lights KS Box 25's, introduced in April, had sold 25.9 million units during the same time period.

Major brand families in Belgium are Belga (18.7%), Peter Stuyvesant (3.3%), Richmond (2.7%), and Johnson (2.7%). All of these brands have also declined in 1993 compared to 1992. Rothmans has introduced five new products into the Belgian market, two in 1992 and three in 1993. None of these has been a market success.

Rothmans has 12.3% of the French market, and major brand families are Peter Stuyvesant (6.2%), Golden American (2.3%), and Rothmans (1.7%). Both Peter Stuyvesant and Rothmans have declined significantly comparing the first 10 months of 1993 to the same period in 1992. Peter Stuyvesant has lost 2.9 share points, while Rothmans has lost 0.7 share points. Golden American, on the other hand, continues to grow quite rapidly, with a 99% increase in volume and a growth of 1.2 share points.

Rothmans has introduced six new products into France since the beginning of 1992, four in 1992 and two in 1993. The introduction of Golden American 25's in March, 1992, was an overwhelming success - as noted above - and Golden American Lights was introduced in September, 1992. These two brands have sold 1.8 billion units through October, 1993. Their success has prompted the

introduction of 25's by Philip Morris, Reynolds, and SEITA. None of Rothmans' other market introductions in France have been successful to date.

With respect to the remaining three countries in Western Europe, Rothmans has a 8.7% market share in Germany, a 2.4% market share in Italy, and a 0.3% market share in Spain. Major brands in Germany are Lord (4.7%) and Golden American (1.5%). Both brands have declined in market share during the last year, despite the introduction of Golden American into West Germany. Rothmans introduced Golden American Lights KS Box 25s in January, 1992, but the brand has not been particularly successful. Sales in 1992 were only 178 million units, and only 130 million units have been sold through October, 1993. Rothmans' only new product introduction into Germany in 1993 was Dunhill Lights, a luxury brand. Rothmans' only major brand family in Italy is Rothmans (1.9%) which has shown neither growth nor decline. A 100's line extension was introduced in September, 1993. Rothmans introduced Cartier Vendome Ultra Lights on the Italian market in October 1992, selling 36.5 million units through October, 1993, and Cartier Vendome Lights in Spain in November 1992, selling 3.3 million units through September, 1993.

(c) Technology Assessment

Rothmans has several R&D centres, and has consistently generated patents, albeit in a limited number. Rothmans has the former Martin Brinkmann laboratories in Germany which includes the Milton Keynes lab of about 100 people and a small laboratory in Bremen consisting of about 25 people. Both labs have as their main activities QA, product development, and process development. The Milton Keynes laboratory is headed by Mr. Domitzlav, while the Bremen laboratory is headed by Mr. Hetzel. All of Rothmans' patents, however, originate either from the laboratories in Aylesbury, UK, or Rothmans Benson & Hedges' laboratory in North York, Canada. In the period between January, 1991, and September, 1993, Rothmans has filed nine different patents which appeared as nine national filings (Canada and UK), 6 European Patent Office (EPO) publications designating 17 states and 3 WIPO publications designating about 32 countries. These patents cover a hexagonal pack for up to 25 cigarettes, the flow through hopper, which is already under study in PM USA Richmond, a relightable cigarette, a special tobacco blend, a low sidestream design, a new filter for lower CO delivery, a Premier type article, equipment which can be used by the consumer to simplify the process of make-your-own cigarettes, and a system for the separation of objectionable particles from tobacco material.

(d) Strategies for Growth

Rothmans, a large multinational cigarette company, is already represented in virtually every country in Western Europe, as well as much of the remainder of the world. As a consequence, unlike monopolies such as Tabacalera and SEITA, it cannot expand its business easily through exploiting new Western European markets. In July, 1992, Rothmans purchased 4% of Albatros Investissement, a holding company that controls 38% of Bollore. This step not only may open up new areas of Africa for Rothmans, which is already well represented in the English speaking areas of Africa, but also may be viewed as a "back-door opportunity" for SEITA to establish closer relations with a multinational cigarette company. SEITA had earlier entered into a agreement with Bollore in establishing Coralma International, a joint unit in Africa which is

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expected to develop "important synergies" with Rothmans. It is anticipated that the English (Rothmans) and French (SEITA) partners will set up a 50-50 joint venture to oversee joint development projects. As its first capital investment in central and eastern Europe, Rothmans is to invest £55 million in a cigarette joint venture (75% Rothmans, 25% Nevo Tobacco) in St Petersburg, Russia. The factory, with an output of 10 billion cigarettes a year, is expected to begin production mid-1995. In addition, it is building a 50-50 joint venture cigarette factory in Shandong province (China). Its brands are targeted for the domestic market. Rothmans has also been quite active in Poland, where it has licensing agreements and is negotiating a stake in the Lublin factory, as well as in the former Yugoslavia.

Within Western Europe, Rothmans by necessity must increase its sales through the growth of current products or the introduction of new products, as is the case with all the multinational cigarette companies. Mr A. Rupert, managing director of Richemont, was quoted as saying (FT Nov. 93), "I would rather keep supporting our brands in a recession than show a big increase in earnings". In this regard it should be pointed out that they, as is the case with SEITA, have been active with respect to the introduction of innovative new products. Not only was Rothmans the first company to introduce the 25's pack on the French market, they were also the first to introduce a light cigarette (Rothmans légère) and an ultra slim cigarette (Vogue) on the French market. It is clear that Rothmans is a competitor which must be watched closely.

(5) BAT

(a) General Information

BAT, also a multinational cigarette company, has a 9.3% market share in Western Europe as defined above. As is the case with other large multinational cigarette companies, BAT has been plotting a course of diversification for some time. However, in 1989, the decision was made to concentrate on two core businesses - tobacco and insurance. In 1992, pre-tax profits for BAT industries rose by 68% to £1.645 billion. The figure would have been higher by £29 million had the group not adopted a new accounting method for its Brazilian operations. Record tobacco trading profits of £1.314 billion (up 24% from 1991) reflected positive results from all operations as the group's share of the world market increased to 10.9%. Sales amounted to £11.89 billion in 1992 for a volume of 570 billion units, with export volumes rising 23% and international brands growing 19%. Financial trading profits recovered from £230 million to £598 million. For the first half of 1993, BAT's total operating income was up 35% to £906 million. The recovery of the financial services division was primarily responsible for the increase.

BAT owns part or all of 61 operating companies, and is represented in every continent of the world. Two of these deserve special mention. The first is the Danish company Skandinavisk Tobakskompagni which is 32% owned by BAT. In that Skandinavisk Tobakskompagni holds 97.9% of the Danish market through its 100% owned subsidiary, The House of Prince, BAT is essentially the only non-Danish company with a significant portion of this market. The implications of this ownership, however, go well beyond simply the Danish market in that the Prince brand has large market shares in both Norway and

Sweden, and has even begun to build market share in Germany. The second company of interest is IMASCO, a Canadian company owned by Imperial. Prior to 1988, BAT and Imperial had 23.5% and 22.4% ownership, respectively, of the holding company, Tobacco Securities. Following a complex series of stock exchanges, offerings, and elimination, BAT appears to have purchased Imperial's share of Tobacco Securities, and changed its name to BAT Holdings. Imperial, in turn, received a 15% share of BAT Holdings, and the ownership of this share was transferred to Imperial's Canadian subsidiary, IMASCO. BAT currently owns a 40% share of IMASCO.

A major development for BAT in 1993 was the swap between BAT and American Brands involving Lucky Strike and B&H. BAT will acquire the Lucky Strike and Pall Mall cigarette brands in France, and in exchange, American Brands will receive Benson & Hedges operations in the duty-paid markets of the EC and the EFTA. BAT owns the Lucky Strike and Pall Mall trademarks in the rest of Europe and will continue to license the brands in France to SEITA. Sales of Lucky Strike in France have increased by 27% a year between 1989 and 1992 to 1.2 billion units. The British subsidiary of American Brands, Gallaher, owns the B&H brand in the UK and Ireland and will now manufacture and market the cigarette throughout the rest of western Europe. BAT will retain control of the B&H brand in European duty-free and other international markets.

(b) Major Products and New Product Activity

In 1993 BAT has significant market shares in the Netherlands (21.8%), Germany (17.3%), and Belgium (13.1%), but has been much less successful in Spain (4.4%), France (3.4%), and Italy (2.9%). As of October, 1993, year to date shares of BAT's major brands in the Netherlands were Barclay (7.0%), Gladstone (4.3%), Belinda (4.2%), Mantano (2.2%), and HB (1.3%). Following last year's trend, all of these brands have decreased in market share compared to the same period in 1992 except for Barclay which has increased from a 6.1% market share. In Germany BAT lost about 0.8% in market share when comparing the first 10 months of 1993 to the same period in 1992. As of October 1993, year to date shares of BAT's major brands in Germany were HB (9.6%), Lucky Strike (1.5%), Prince (1.2%), and Pall Mall (1.1%). Market share of HB, has declined significantly (0.8 share points); however, market share for both Prince and Pall Mall have remained constant (although volume has decreased). On the other hand, market share and volume for Lucky Strike have increased significantly (0.4 share points and 31.9% in volume). The top three brands in Belgium are Barclay (5.5%), Boule d'Or, (3.5%), and Kent (0.9%). Market share for all three brands has declined slightly. BAT's best selling brands in Spain are Lucky Strike (2.6%) and Royal Crown (1.0%). Both brands have declined significantly in market share. In Italy, BAT's best two brands are Kim (1.4%) and Capri (0.7%) which have declined only slightly in market shares. Finally, in France, as noted above, BAT now owns Lucky Strike and Pall Mall which are made under license by SEITA. As of October 1993, year to date market shares were 1.1 and 0.3%, respectively, decreasing slightly from the previous year.

BAT's products show a pattern that is significantly different from those of the other multinational cigarette companies. Each country has a seemingly very different assortment of BAT brands. For instance, HB is BAT's best selling brand in Germany (and still the second best selling brand overall in Germany behind Marlboro), but except for Belgium, where it has a 1.6% market share, it

is not a significant brand in the other four countries. Barclay is doing well in both the Netherlands and Belgium, but is not a factor in the other four countries. Brands such as Kim (Italy), Boule d'Or (Belgium), Gladstone (Netherlands) and Belinda (Netherlands) all appear to be one-country brands. In actuality, most of these brands have been marketed in all six west European countries. However, for whatever reason, they have done well in only one or two markets. Consequently BAT's success in the region derives from marketing a large number of brands, some of which sell well in individual countries, as opposed to having one or two "corporate brands" which do well in the entire region.

Given BAT's history of marketing many brands, it is somewhat surprising that they introduced only relatively few products in 1992. Last year they launched only three new products - one in Germany and two in Belgium. Their most successful new brand was Barclay Ultra Lights KS Box in Belgium, introduced in January, 1992, which has sold 90 million units through October, 1993. However, BAT has been far more active in 1993. Three products were introduced into Germany, four into Italy, three into France, one into Belgium, and three into the Netherlands. None of these products has performed particularly well at this time. It is worth noting, however, that the two new product launches in France represent the initial introduction of Barclay into that country.

(c) Technology Assessment

BAT has four R&D laboratories, three in Europe, and one in the United States. One of the European laboratories, located in Geneva and headed by Mr. W. Bizon, consists of only about 25 individuals, and functions solely to carry out QA work and a minimum of product development. The remaining three labs have staffs of at least 100, and all three have been quite active in producing patents for many years. BAT GmbH, located in Hamburg and headed by Dr. Kausch, has a current staff of about 100 individuals. In the nine month period between July 1, 1991, and March 1, 1992, 10 patents or EPO publications originated from BAT GmbH, as well as four patents joint with Brown & Williamson (B&W) in the US. BAT UK, located in Southampton and headed by Mr. G. Reed, has a staff of 120. During the same time period, the British lab produced four patents or EPO publications. The Southampton laboratory to some extent functions as a corporate lab, in that most of the company's basic research is conducted there. Finally, the B&W lab, located in Louisville, Kentucky, and headed by Mr. Wigand, consists of about 200 individuals. Over the period covering 1992 and the first half of 1993, BAT has published what amounts to 30 different patents. Seven were attributed to BAT-UK. They include:

Three patents on tobacco processing - reconstituted tobacco, extraction processes, and separation of mixed stem material.

One patent on a low side stream cigarette design.

One patent on a cigarette construction for enhanced impact.

Two patents on machinery - packer with printing unit, and measure of cigarette pressure drop

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Twelve patents were attributed to BAT Germany. They include:

Two patents on tobacco processing - drying procedure to enhance filling power, and reconstituted tobacco.

Three patents on cigarette design - filter design, and two designs of co-axial cigarettes.

One patent on pack design.

Four patents on machinery - primary measuring equipment (3) and a device for measuring the tension of a band.

One patent on cultivation practice to improve resistance of the plant.

One patent on a smoking machine holder

Eleven patents were attributed to B&W in the US. They include:

Four patents on non-conventional smoking articles.

Two patents on packaging.

Five patents on machinery - optical detection of foreign material, adhesive applicator and loose filter detection in makers, a packaging and conveying system, and computer controlled quality control of cigarettes on several makers.

BAT has had a long-standing strategy with respect to patents which continues to cause PM difficulties; namely, filing patents with little or no supporting results. Many such patents could never actually be reduced to practice, and as such are of no consequence. Often, however, ideas are patented which could have just as easily been patented by PM. A recent example of this, mentioned above, is the development of a biodegradable filter using ICI's Biopol. Even if such a patent could eventually be overturned because of obviousness or because of errors due to lack of reduction to practice, the cost involved to take this action is quite high. As a consequence, it is important for PM R&D to pursue an aggressive patent policy to ensure that we can commercially exploit our own ideas.

(d) Strategies for Growth

As pointed out above, BAT has 61 operating companies, and is well represented throughout the world. In the US, B&W saw a significant drop in its profits in 1993, but it has two-thirds of its 55 billion unit sales in the price-value segment which has done extremely well to date. In western Europe the financial figures look better than they really are, due to exchange rates and the financial bonus from the American Brands transaction. BAT still appears to have a strategy of growth, as BAT Germany spent in 1992 about DM 54 million in modernising and enlarging its production capacity in Berlin and in Bayreuth, while another £175 million will be invested in the Southampton factory to double its capacity (to 55 billion units per year) which will confirm its position as BAT's third largest factory. Asia-Pacific is also an area of opportunity, but BAT stated that it had no plans to develop joint ventures in China, despite a long time

involvement before the revolution. In Australasia volumes and profits have been higher overall. In South America profits increased significantly last year on slightly higher volumes.

The one area which has recently opened is, of course, the Eastern European countries and the CIS where BAT has been quite aggressive in establishing a presence. In 1992, BAT went into a 90% joint venture with the Hungarian State Property Agency concerning the cigarette factory in Pécsi, Hungary. The Pécsi factory was a successful business, even in 1991, with sales of 2.5 billion forints and pre-tax profits of 266 million forints. BAT announced plans to invest 19 million pounds during the next three years, and to use the factory in Pécsi to supply the Middle East with BAT brands. Results to date in 1992 have surpassed BAT's expectations. Output has increased, while costs have been reduced. The factory, which previously supplied 40% of Hungary's 27 billion cigarettes a year, has profitably raised its market share to 47.5% in 1992, its leading brand being Sopianae. In Russia, BAT signed in 1992 a letter of intent with the management of the Yava factory, Moscow's largest factory. To clinch the Yava deal, BAT will have to secure the agreement of the 1400 factory workers and management, and this is foreseen to be a long process. Should a final agreement be reached, BAT will have to make a major investment in order to modernise the pre-1915 factory in order to increase efficiency and improve the quality of its output of 14 billion cigarettes per year. A BAT team has visited more than half of Russia's remaining 23 cigarette factories, and at least two more ventures seem likely to follow - one near Moscow and another in Siberia. A joint venture was set up in the Ukraine with the Collective Enterprise Prilucky Tobacco. BAT will hold a 65% stake with the staff holding the remainder, and it announced plans to invest \$ 35 million over the next 5 years to produce filter tip cigarettes. The Cherkassy company, for which it had also signed a letter of intent, was eventually acquired by Reemtsma. BAT, which is helping to improve the republic's tobacco crop, is also talking about investing in a leaf processing plant at Monastirisk. In Poland, BAT is engaged in intense negotiations over the acquisition of a stake in the Lodz factory. In addition, exploratory talks continue about possible developments in other former Soviet republics, as well as Bulgaria and Romania.

(6) Monital

Monital, the Italian monopoly, had in 1992 a market share of 8.8% in the Western European market as defined above. Monital markets what is still the number one brand family in Italy, MS, with a market share of 32.6% in 1992 but dropping to 31.4% for the first 10 months of 1993. Market shares for both MS and Monital as a whole have declined steadily since 1985. Monital brands, at 38.2 billion units, accounted in 1992 for 45.7% of the Italian market. In fact Monital has recently dropped to the number two manufacturer in Italy, with Philip Morris becoming number one.

Monital has essentially no export business and does not appear to be pursuing any strategies to increase its export business. Monital also has extremely limited technology resources. They have a small central laboratory in Rome, headed by Dr. Rossi, which is staffed by about 20-25 scientists and technicians. This lab, in theory, is responsible for QA, product development, and process development. Each factory also has its own QA department.

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It is clear that Monital is not a major threat to Philip Morris, and it is not likely to become one during the plan period. Although we have no hard financial data, Monital is the only major Western European competitor which is actually losing money. Its future remains uncertain at this time. The current situation was well represented in an August, 1992, article in *Tobacco Reporter* which pointed out that a report commissioned by the Ministry of Finance concluded that 15 of the Monopoly's 21 manufacturing plants should be closed and half of its 13,000 employees be dismissed in order to avoid imminent bankruptcy. The Monopoly is not fully to blame for the crisis, however. It has suffered under intense political pressures for decades. As an example, lobbyists for farmers have been successful in forcing the Monopoly to buy large proportions of domestic tobacco. This has compromised quality, and has handcuffed attempts to produce new blends which meet consumer demands. In 1992, the Italian Parliament approved the privatization of the monopoly, but national tobacco workers, fearing loss of jobs, staged a strike that removed Italian cigarettes from the shelves for nearly two months, adding to the demand for foreign-made products and eroding consumer loyalty for domestic brands. The Italian Parliament Finance Committee has more recently stated that the larger part of the company will not be privatized but converted into a joint stock company.

(7) Reemtsma

(a) General Information

Reemtsma is the largest independent cigarette company still remaining in Europe. In October, 1993, it held a 7.8% market share in western Europe, as defined above, but it is likely that its market share will increase during the plan period. In 1992, operating profits were reported at \$166.5 million, up almost 60% over 1991. Net turnover rose 21.7% to \$ 1.35 billion. Of this increase, DM 1.5 billion was from German sales and DM 829 million came from foreign business.

Reemtsma is a German company, and the majority of its total income is still derived from sales in Germany. The company has, however, established a significant number of subsidiaries, the most important of which are CINTA, in Belgium, which is more than 50% owned by Reemtsma, and Roth-Haendle in Germany, which is more than 75% owned by Reemtsma. As will be discussed below, Reemtsma is continuing to expand, both in western Europe and eastern Europe.

(b) Major Products and New Product Activity

Reemtsma is the second largest tobacco company in Germany. Major brand families include West (with a year to date market share of 8.3% as of October, 1993) the third largest selling brand in Germany behind Marlboro and BAT's HB, Peter Stuyvesant (4.1%), Reemtsma (R1-R6) (3.3%), Emte 23 (2.2%), Reval (1.9%), Cabinet (1.7%) which is primarily an East German brand, and Rothaendle (1.3%). Reemtsma's West brand family is doing extremely well, with market share increasing from 7.5% in 1992 to 8.3% in 1993. Both the full flavor and lights packings have shown an increase. The Reemtsma family is stable in market share. All the remaining brands have undergone a minor decline. The only other Western European country in which Reemtsma is well represented is

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Belgium, through its subsidiary CINTA. CINTA has a 16.6% share of the Belgian market in 1993; however, that volume is composed of three parts. The first is CINTA's only brand, Bastos, which has an 9.0% market share. The second (5.7%) is contributed by brands manufactured under license from SEITA, of which the major brand is Gauloises, and the last is Reemtsma's own brands (1.9%) of which the largest seller is West (0.9%). Both Bastos and West have increased somewhat in market share - Bastos from 8.7 to 9.0%, and West from 0.7 to 0.9%. Reemtsma has 3.5% of the Netherlands market, with the two largest brands being West (1.1%) and Reemtsma (0.8%). Market share of West is stable, but Reemtsma has declined slightly. Reemtsma's market share in Italy is only 0.3%, and it has essentially negligible sales in both Spain and France.

Reemtsma launched two new brands in Germany in 1992 and one brand in 1993. The two brands launched in 1992 were both promotional items (West Cola and West Documentia) and are no longer on the market. In September, 1993, Reemtsma launched New West which was then forced off the market. This brand will be discussed below. Reemtsma launched three new products on the Italian market in 1993. None of them has yet sold well. Two West line extensions were introduced onto the Dutch market in early 1993. Once again, sales have been minimal. In 1992, Reemtsma attempted the initial introduction of West into Spain. Sales through September, 1993, have only been 8.6 million units. In short, Reemtsma has had minimal success with new product introductions. Unit sales of new products introduced in both 1992 and 1993 have only been 94.6 million units (excluding Bastos line extensions in Belgium) which constitutes only 0.6% of total new product sales.

Reemtsma's major new product introduction was New West, a supposedly ecological friendly product. This product was constructed with a paper filter, oxygen-bleached paper, no polypropylene or aluminum foil, and no additives to the tobacco. It was the latter which gave them problems in that humectants had been added to the tobacco. An injunction forced Reemtsma to withdraw the product. There is no evidence that the product would have sold, in that there have been other attempts to market cigarettes to environmentally conscience consumers which were not successful. However, Germany is well known as a market which is extreme with regard to environmental concerns. It is quite likely that the product will be re-introduced in early 1994 with a modified advertising campaign.

(c) Technology Assessment

Reemtsma has a laboratory located in Hamburg headed by Dr. W. Rahn, with a staff of about 100. The lab has the capability for QA, product development, process development, and research. Reemtsma is very closely associated with the Ergo lab in Hamburg, which carries out analytical contract work with a staff of about 20, and is headed by Dr. M. Ball. The Reemtsma annual report explicitly discusses their R&D department. Since the beginning of 1992, Reemtsma has filed 6 different patents. Three deal with the making of rolls for roll-your-own cigarettes, two with new filter designs, and the latest one with a triple plug filter which is claimed to be more economical and biodegradable.

(d) Strategies for Growth

Reemtsma will undoubtedly continue to increase sales within western Europe with both the Reemtsma and West families. These brands are showing growth

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in both Belgium and the Netherlands, and can be projected to become successful in these two countries. In 1992 Reemtsma invested DM 120 million in its Berlin factory and DM 130 million in its manufacturing centre in Langehagen which should reach a daily capacity of 50 million pieces in 1994. A second expanded tobacco plant using the nitrogen process will be built. Nevertheless, Reemtsma's greatest efforts to enter new markets outside of Germany are being conducted in Eastern Europe. In early 1991 Reemtsma purchased the Debrecemo Dohanygyar tobacco factory in Hungary with a production capacity of over 6 billion. This factory owns the Symphonia trademark which is the second largest selling brand in Hungary with a stable 30% market share. The number one brand is Sopianae, owned by BAT's Pécsi factory.

In the fall of 1991 Reemtsma acquired a 58.8% stake in Tobacna Ljubljana in Slovenia (the remainder being held by Slovenian shareholders 23.5% and SEITA 17.7%). In 1992, DM 17 million were invested in the factory and production increased 30% over 1991 to 5.7 billion units. In 1992, over a quarter of the production was exported, mainly to Russia, Belgium and Italy. In April, 1992, Reemtsma purchased a 31% stake in the factory CSTP, Slovakia, which has since changed its name to Slovak International Tabak AG. In February, 1993, they obtained a full 100% ownership of the company. The total investment was DM 150 million. Production is aimed at the domestic market with the brands Mars and Dalila (90% combined market share), but international brands will be manufactured with licenses for Milde Sorte (ATW) and Gauloises Blondes (SEITA). In 1992, Reemtsma set up the distribution company Reepol in Poland, selling an average of 180 million cigarettes a month, and it is considering a direct investment in manufacture once the legal framework for privatization is established. Reemtsma brands are already produced under license in Poznan. Lastly, in November, 1993, Reemtsma acquired a 65% stake in the Ukraine's second largest cigarette producer, Cherkassy, south of Kiev, which is said to produce about 12 billion cigarettes annually. With a stated interest of buying a part of SEITA when it is privatized, it is clear that Reemtsma has set itself the goal of changing from a German to a European company.

(8) RJ Reynolds

(a) General Information

RJ Reynolds had in 1992 a 6.6% share of the western European market as defined above. Despite the relatively low volume, Reynolds' European operations are becoming increasingly important to the company for two reasons. The first is that profits from their US operations have declined sharply as a consequence of the price cuts in the premium brand sector, whereas their international tobacco business continues to perform well. The second is that several of their European factories, particularly those in Germany, have become major exporters for RJ Reynolds products.

Reynolds' financial figures for year-end 1992 indicate that there were problems with the US tobacco business even before the price cuts in the premium brand sector occurred. Total sales of \$15.73 billion showed a 4.9% increase compared to year-end 1991, while operating income decreased by 1% to \$2.90 billion. Net sales for tobacco were \$9.03 billion, a 5.7% increase as compared